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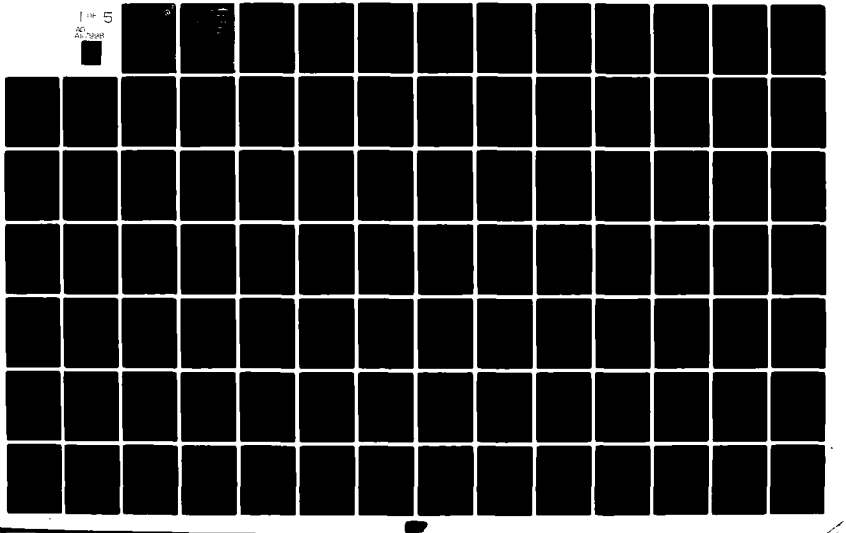

SM-ALC/MME TR 79-54, Volume II
18 December 1979

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RESULTS OF A SURVEY: SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN THE U.S. AEROSPACE INDUSTRY

Volume II

PROJECT MANAGEMENT TECHNIQUES, PROCEDURES AND TOOLS

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McClellan Air Force Base, California 95652

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ABSTRACT

RESULTS OF A SURVEY ON MANAGEMENT TECHNIQUES AND PROCEDURES
USED IN SOFTWARE DEVELOPMENT PROJECTS BY THE US AEROSPACE INDUSTRY

BY

Richard H. Thayer and John H. Lehman

This report contains the results of a survey conducted in 1977 and 1978 on how the US Aerospace Industry manages its software development projects. The sample of the US Aerospace Industry surveyed was those companies who had a membership in the AIAA Technical Committee on Computer Systems. These committee members represented 47 major corporations or major corporate subdivisions and occupied top positions in software management within their firms.

The survey used a questionnaire containing 225 numbered questions on project management. By using "multiple choice-multiple answer" questions, approximately 1,328 separate responses were possible. The survey was divided into three parts. Part One dealt with defining the organization, management structure, and philosophy of the firm. This part was intended to be answered by top management to provide the backdrop against which the individual projects would be viewed. Part Two concerned individual software development projects and was intended to be completed by the project manager. Part Three was designed to obtain the opinions and perceptions of software development project managers on major issues and major problems of software engineering project management.

This paper reports the results from Part Two; that portion of the questionnaire dealing with actual projects. Parts One and Three, the portions dealing with the company environment and software development problems, are reported on in Volumes I and III.

The answers from the surveyees were abbreviated or coded and tabulated in this report. In addition, a portion of the narrative answers to the survey were also reported. To protect the participants, all references to individuals or their companies have been eradicated. This report does not attempt to analyze or come to conclusions about the data only to report it as clearly as possible.

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SECTION 1
RESULTS

BACKGROUND

The survey in the title of this paper was a survey of the US Aerospace Industry to determine what management techniques and procedures are used by the aerospace industry in their software development projects. This survey was designed, written, tested, and implemented by the authors in the spring and summer of 1977. This survey was accomplished to collect data for the preparation of a paper on software engineering project management which was presented at the American Institute of Aeronautics and Astronautics (AIAA) Conference, Computers in Aerospace, 31 Oct - 2 Nov 1977.

That portion (or sample) of the US Aerospace Industry that was surveyed were those companies who had a membership in the AIAA Technical Committee on Computer Systems (who were the host to the conference on Computers in Aerospace). These committee members represented 47 major aerospace corporations or major corporate subdivisions and occupied top positions in software management within their firms. These committee members were in an ideal position to report on how the US Aerospace Industry manages its software development projects.

Initial contact was made in May 1977 to determine which members of the committee would be interested, willing, and able to participate. Forty-five members, representing 35 companies, agreed to respond. The initial draft of the survey was completed in June 1977 and was critiqued by approximately 25% of the total committee membership. The results of this critique, along with other corrections, were incorporated into the final survey. The survey was mailed 10 August 1977. On 6 September 1977, with 29 of the completed surveys on hand, the authors wrote the first report for the proceedings of the Computers in Aerospace conference. This paper can be found in the conference proceedings, A Collection of Technical Papers. By the time the presentation was given on 1 November 1977, 55 projects were reported on, representing 33 companies or 70% returns. The companies surveyed were predominantly aerospace firms, with government contracts, reporting on large to very large projects. The presentation

given by author Richard H. Thayer at the conference (called Report Nr 2, AIAA Project Management Survey) used the more complete data and a different approach.

However, the survey did not end there. More completed forms still trickled in until by the spring of 1978, 62 projects had been reported on, representing 37 firms for a 76% return rate. This later increased to 66 by the end of the summer 1978 for 86% return rate (see Appendix A for a list of participants). Because of this extensive participation, a decision was made by the AIAA Technical Committee on Computer Systems to make further use of the data by writing an assessment paper on the state-of-the-art in software development project management. Mr. Gene F. Walters, General Electric Company, Command and Information Systems, and Mr. Jack E. Bloodworth, Boeing Aerospace Company, were given primary responsibility for this paper.

In order to meet these goals, the Rome Air Development Center, the Sacramento Air Logistics Center, and The Boeing Aerospace Company offered their services, and in some cases the services of their company's data processing capability, to reduce and analyze the data.

The remaining problem was to reduce the data into a form useable by a computer. This involved "coding" the narrative portions and free form answers of the survey, verifying that the answers were consistent, and abbreviating all "fill in the blank" answers. This was accomplished by one of the architects of the survey, Richard H. Thayer.

PURPOSE OF SURVEY

The purpose of this survey was to view a sample of the US Aerospace Industry through the use of a questionnaire to determine how this industry managed their software development projects. Specifically, the questions the survey attempted to answer were as follows:

1. What are the current practices in Software Engineering Project Management today?
2. Are the new developments in management, i.e., "modern" management techniques or project management techniques, being used?
3. What are the trends in the Software Engineering Project Management?

4. What are the relationships between Software Engineering Project Management techniques and successful delivery of software?

5. What are the relationships between various elements of Software Engineering Project Management as a system?

6. What are the relationships between "modern" Software Engineering techniques and Software Engineering Project Management?

THE SURVEY

The approach taken in answering the questions was first to design a model of software engineering project management as a system, define the elements of that model, and hypothesize relationships between those elements. Second, was to form a questionnaire around this model using the various elements or variables of the model as questions and possible answers (see Appendix B for a copy of the questionnaire). The survey used a rather lengthy questionnaire containing 225 numbered questions. Beyond that, by using "multiple choice-multiple answer" questions approximately 1,328 separate responses were possible.

The 72 page survey was divided into 3 parts. Part One dealt with defining the total organization, management structure, and philosophy of the firm. This part was intended to be answered by top management to provide the backdrop against which the individual projects would be viewed. Part Two concerned individual projects and was intended to be completed by the project manager. Part Three consisted of general questions, not project specific, calling for evaluation, opinions, and suggestions on the major problems of software engineering project management. Part Three was also intended to be completed by a project manager.

PURPOSE OF THIS REPORT

This report was prepared as a means of (1) reducing the answers to Part Two and Questions 1, 2, 3, 4, and 25 of Part Three of the questionnaire in "raw form" so that they could be computerized, and (2) providing the answers to the questionnaire to satisfy the many requests from the computer community for access to the data collected as a result of this survey. (The answers to Part One and the remainder of Part Three are provided in Volumes I and III.) Because of the restrictions placed by the participants on the use of their submissions, the survey forms with the complete answers cannot be distributed. This report was selected as a means of capturing and documenting as much of the raw data as possible without revealing the source of the information. In essence, this report does not contain "raw data," but reduced data in abbreviated and coded form which will effectively disguise the participant but still allow interested computer scientists to

use the data for their own requirements.

This report does not attempt to analyze or come to conclusions about the data, only to report it as clearly as possible. Only minimum interpretation was made to enable the answers to be tabulated for eventual analysis. Although 66 projects were reported, the authors removed six projects that did not seem to fit the norm, leaving a set of 60 projects.

CONTENTS OF THIS REPORT

As already stated, the purpose of this report is not to analyze the data from the AIAA Project Management Survey, but to report it as simply and accurately as possible, and, to keep within the original ground rules of maintaining anonymity of the participants. Section 2 contains the questions and answers to this survey and Section 3 contains cited references. The participants in the survey are listed in Appendix A.

Because of its length a duplicate copy of the questionnaire is in Appendix B. The purpose of this duplicate set is to allow the reader to quickly peruse the questions and possible answers in order that he can determine what type of material is covered.

Appendix C contains the abbreviations used in reporting the narrative portions of this survey as well as comments on the answers themselves. These comments pertain primarily to such things as accuracy of the answer, relationship between questions, and procedures used in contriving missing answers. Since the reduction of comments to code destroyed some of the richness of prose, the authors felt it worthwhile to include the actual written answer to certain specific questions. These answers are reproduced in Appendix D. To maintain the concept of protecting the participants identity, the narrative answers cannot be tied to any particular participant in Section 2.

THE FUTURE

This survey is, as far as the authors can determine, the first attempt to query industry on such a large scale on how software engineering projects are managed. A look at the list of contributors in Appendix A will attest to the importance of this base of answers. The tremendous volume of questions answered and the excellence of the responses dictate

that this data be utilized either in whole or part as a reference for other papers, reports, possible texts, and other technical publications for the benefit of the US Aerospace Industry and the data processing community. The AIAA Technical Committee on Computer Systems is anticipating the preparation of an assessment paper on how industry manages its software engineering projects. This committee welcomes suggestions from the computing and aerospace communities on how to best use this data for the benefit of all. All suggestions should be sent to either:

Mr. Gene F. Walters
Mgr, Software Technologies
Information Systems Programs
General Electric Company
450 Persian Drive
Sunnyvale, CA 94086
(408) 734-4980

Mr. Jack E. Bloodworth
Mgr, ALCM Software
The Boeing Aerospace Company
MS-45-70
P.O. Box 3999
Seattle, WA 98124
(206) 655-6718

The Rome Air Development Center (RADC) has contracted with ITT Research Institute (IITRI) to establish and operate a software information analysis center. The center has been named the Data and Analysis Center for Software (DACS). One of the functions of DACS is to acquire and analyze data gathered during the various phases of the software development process with the purpose of identifying and quantifying those factors which contribute to the production of quality software. The data from this survey has been contributed to DACS and is available for analysis by any member of the AIAA Technical Committee on Computer Systems as well as the general computer community. Personnel interested in receiving copies of this data, or requesting analysis of this data should contact:

Ms. Lorraine Duvalle
Data & Analysis Center for Software
RADC/ISI
Griffiss AFB, NY 13441
(315) 336-0937

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From the General Electric Company, Space Division

The Information Systems Program in Sunnyvale provided technical consultant support, proofreading, printing and encouragement through the services of Mr. Gene F. Walters and his technical group.

From the Rome Air Development Center

RADC has offered to perform analysis of the data for the benefit of the US Air Force, the AIAA Technical Committee on Computer Systems, and the computing community. Personnel responsible for this are Mr. Donald Roberts and Mr. Alan R. Barnum. Ms. Lorraine Duval, ITT Research Institute, who is general manager of the RADC Data and Analysis Center for Software (DACS), became the repository of the data from this survey and provided much of the reduction and statistical correlation.

ATTACHMENT 1 TO SECTION 1

RELATIONSHIPS BETWEEN REPORTS

The survey was comprised of three parts: Part One, Part Two, and Part Three. Each dealt with a separate facet of software engineering project management. Part One dealt with the firm and the environment in which the project was done. Part Two devoted itself to specific software engineering projects accomplished within the firm. Part Three asked the project managers their opinions about project management. Each of these parts can, and does, stand alone. Part One (results reported in Volume I) reports on the financial status, organization, management policies, staffing techniques and project controls of the companies that report on the projects in Part Two.

Part Two (results reported in Volume II) reports on a series of independent projects which could be considered case studies on how the aerospace industry is managing projects today. Part Three (results reported in Volume III) concerns ideas and perceptions about software engineering project management and does not relate to a given project or company.

At the same time, there is a relationship between these reports. For instance, you might be interested in knowing about the company environment that produced the project. In that case, you would want to know which company reported on which projects. You might be interested in knowing the background and project environment which created the ideas and assumptions made in answering Part Three. In that case, you would want to know the relationship between the man who reported the perceptions, ideas and problems associated with software engineering project management and the project he worked on. To this aim Table 1 tells the relationships between Volumes I, II and III of this report.

Each survey answer was given a number for tracking purposes. Within this number, of course, is a Part One, Part Two, and Part Three. Since one Part One might cover a number of Part Two's, and the Part Three may or may not be answered by the same person that answered Part Two, the relationship between these is contained in the table. Each company was given a two-digit identifier, each project was given a three-digit

identifier, and each answer to Part Three was given a three-digit identifier. To determine the common company relationship between projects, look up the common company identifier in Table 1. To determine whether or not the same person answered Part Two and Part Three, look under the column that identifies Part Three. If the entry is "yes", the same man wrote Part Two and Part Three. If the entry is "no", a different individual answered each part.

Projects 301 through 306 have been deleted for this report due to size or incompleteness.

TABLE 1

(ATTACHMENT 1 TO SECTION 1)

RELATIONSHIPS OF PROJECTS REPORTED IN AIAA

PROJECT MANAGEMENT SURVEY

VOLUMES I, II and III

Survey Identification Nr (1)	VOL I (Part One) (2)	VOL II (Part Two) (3)	VOL III (Part Three) (4)
101	30	101	Yes
102	30	102	Yes
103	30	103	Yes
104	31	104	Yes
105	33 (8)	105	Yes
106	34 (8)	106	Yes
107	35	107	Yes
108	35	108	Yes
109	35	109	Yes
110	36	110	Yes
111	36	111	Yes
112	39 (9)	112	Yes
113	40 (9)	113	Yes
114	41	114	Yes
115	69	115	No
116	42	116	None
117	43	117	Yes
118	45	118	Yes
119	45	119	Yes
120	51	120	Yes
121	66 (5)	121	Yes
122	51	122	Yes
123	51	123	Yes
124	51	124	Yes
125	52	125	Yes
126	55	126	Yes
127	None	127	Yes
128	59	128	No
129	None	129	Yes
130	31	130	Yes
201	67	201	None

(1) Survey Identification Nr	(2) VOL I (Part One)	(3) VOL II (Part Two)	(4) VOL III (Part Three)
202	27 (7)	202	Yes
203	28 (7)	203	Yes
204	29	204	Yes
205	32	205	Yes
206	37	206	Yes
207	37	207	Yes
208	38	208	Yes
209	43	209	Yes
210	44	210	Yes
211	46 (10)	211	Yes
212	47 (10)	212	Yes
213	49	213	Yes
214	49	214	Yes
215	49	215	Yes
216	49	216	Yes
217	50	217	Yes
218	53 (11)	218	Yes
219	54 (11)	219	Yes
220	56	220	Yes
221	57	221	Yes
222	60	222	Yes
223	60	223	Yes
224	58	224	Yes
225	58	225	Yes
226	58	226	Yes
227	61	227	Yes
228	61	228	Yes
229	64	229	Yes
230	68	230	Yes
301	26 (6)	301	Yes
302	48 (10)	None	None
303	25 (5)	None	None
304	68	304 (12)	None
305	62	None	None
306	63 (7)	None	Yes

FOOTNOTES FOR TABLE 1

(1) Column 1 - This column lists the returned surveys according to a randomly assigned identification number.

(2) Column 2 - The company identification number is listed in column 2 and is used in Vol I to describe the company and environment for the project reported in Vol II. Projects with the same company number are from the same company and/or major subdivision and were completed by a single member of the company. In other cases, the same company was reported on by two or more individuals. This was caused by two or more project managers, who reported on different projects within the same company. Most of the time these "double" reports were the same. Comments along these lines are contained in foot notes (5) through (12).

(3) Column 3 - This column lists the project numbers reported in Vol II.

(4) Column 4 - Vol III reports on data from Part Three. This column indicates whether or not the same person reported/wrote Part Two and Part Three of the survey. This is done so that the reader can know if there is any relationship between the project reported on in Part Two and the surveyee's opinions on the major problems of software development management. Source of this information is personal knowledge of the author, comparison of handwriting, color of marker, and correspondence with the surveyee.

(5) Company 25 and 66 are the same.

(6) Very small company.

(7) Company 27, 28 and 63 are the same. Answers reported under company 28 looked to be the most accurate and complete.

(8) Company 33 and 34 are the same. Answers reported under company 33 looked to be the most accurate and complete.

(9) Company 39 and 40 are the same and have identical answers.

(10) Company 46, 47 and 48 are the same. Answers reported under company 46 are considered to be the official answers by the surveyee.

(11) Company 53 and 54 are the same. Answers reported under company 54 looked to be the mose accurate and complete.

(12) Project reported under project 304 was too large to be included.

SECTION 2
THE DATA

INTRODUCTION

This section reports on the actual data submitted by the participants on sixty aerospace projects. It is reported in tabulated, abbreviated and coded form and cannot be used completely without Appendix C. Every effort was made to disguise the contributor, including the deletion of some revealing data.

The questionnaire contained many different styles of questions: true or false, multi-choice answers, multi-part questions, fill-in-the-blanks, and narrative. Despite this multitude of styles, a common method of reducing and reporting the answers was developed (see Appendixes B and C). Multi-part questions were broken into separate questions through the use of part numbers (i.e., 01, 02, 03, etc.) and sub-part designator (a, b, c, d, etc., and 001, 002, 003, etc.).

Each question is handled separately and reported as an array. The horizontal indices of the array refer to anonymous project identification numbers (see Section 1 for further explanation). The vertical indices refer to the question, part, and subpart number. Every narrative answer has been coded or abbreviated by a three-character alphanumeric (see Appendix C for further explanation of codes).

Generally speaking, the printing of a three-character alphanumeric opposite the subpart of a question indicates that the participant answered "yes" or "true" as it applies to that part of the question. If a given question has a "blank" for an answer this indicates the surveyee answered "no" or "false" as pertains to that part of the question. With the exception of "none" or "missing" the alphanumeric is a code or abbreviation of a text answer that modifies the "yes" answer. The interpretation or meaning of the codes can be found in Appendix C. The authors made every attempt to use codes that were easy to recognize (mnemonic).

The questionnaire as printed in this report is a modified version of the questionnaire as originally answered (see INTRODUCTION TO APPENDIX B, Questionnaire for explanation).

QUESTION 1 WHAT WAS/IS YOUR POSITION IN RELATION TO THE PROJECT YOU ARE REPORTING ON? (ORIGINALLY NARRATIVE)

A. PROJECT MANAGER
B. SOFTWARE PROJECT MANAGER
C. PROJECT MANAGER'S SUPERVISOR (PROGRAM MANAGER)
D. TECHNICAL DIRECTOR OR TECHNICAL ADVISOR
E. PROJECT INDIVIDUAL
F. CORPORATE OFFICER
G. CUSTOMER
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		C02		C02				C02	C02	C02	C02				C02					C02	C02		C02	C02	C02					C02
01 B	C02				C02	C02						C02	C02			C02	C02	C02	C02										C02	C02
01 C																									C02		C03			
01 D			C02																							C02				
01 E							C02																							
01 F																					C02									

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A						C02	C02			C02		C02					C02										C02	C02	C02	
01 B					C02			C02	C02		C02		C02	C02	C02	C02		C02		C02	C02	C02		C02	C02	C02				
01 C				C02																										
01 D	C02		C02																C02											
01 E																						C02							C02	
01 G		C02																												

QUESTION 2 IN WHAT APPLICATIONS/FUNCTIONAL AREA(S) DID THIS (SOFTWARE) PROJECT FALL? (ADDED)

A. COMMERCIAL/BUSINESS, SUCH AS INVENTORY CONTROL, PAYROLL, ACCOUNTING AND FINANCE, ETC.
B. DATA ACQUISITION/RETRIEVAL
C. SCIENTIFIC, SUCH AS ENGINEERING CALCULATIONS, DATA REDUCTIONS, ETC
D. SIMULATION OR MODELING APPLICATIONS
E. PROCESS CONTROL TO INCLUDE EMBEDDED COMPUTER SYSTEMS (MANLEY,1974)
F. COMMAND AND CONTROL SYSTEMS
G. MANAGEMENT INFORMATION SYSTEMS
H. COMMUNICATION SYSTEMS, MESSAGE SWITCHING
I. COMPUTER SYSTEMS, SUCH AS SOFTWARE MONITORS, COMPILERS, OPERATING SYSTEMS AND OTHER SYSTEMS SOFTWARE
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES				YES															YES							YES
01 B																					YES		YES		YES					
01 C	YES						YES						YES					YES	YES					YES		YES				
01 D	YES																					YES		YES		YES				
01 E	YES					C03			YES			C03				YES	YES			C03				C03			YES	C03		
01 F	YES	YES	YES							YES	YES		YES	YES			YES			YES				YES		YES				
01 G																						YES								
01 H			YES																		YES			YES		YES			YES	
01 I	YES		YES		YES		YES																YES	YES		YES				

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																											YES	YES		YES
01 B		YES				YES						YES					YES	YES			YES				YES					
01 C						YES												YES						YES				YES		
01 D						YES			YES									YES		YES						YES			YES	
01 E			C03			YES	C03				YES	YES						YES										C03		
01 F	YES	YES		YES				YES	YES				YES	YES	YES	YES		YES	YES			YES		YES		YES				
01 H		YES						C03															YES							
01 I					C03				YES		YES	YES						YES		YES								YES		

QUESTION 3 THE PROJECT WAS:
A. A NEW SOFTWARE DEVELOPMENT
B. A CONTINUATION OF A PREVIOUSLY COMPLETED SOFTWARE DEVELOPMENT
C. A MAJOR MODIFICATION OF AN EXISTING SOFTWARE SYSTEM
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES			YES		YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES		YES	YES	YES			YES	YES	C04
01 B							YES															YES								
01 C				YES	YES		YES										YES			YES		YES					YES	YES		

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES						YES	YES	YES	YES	YES	YES	YES		C03		YES	YES	YES	
01 B													YES			C03									C03			YES		
01 C	YES								YES			YES		YES	YES									YES	C03	YES		YES		YES

QUESTION 4 IF THE PROJECT WAS A MAJOR MODIFICATION DID IT INVOLVE:
A. TRANSFERRING EXISTING SOFTWARE TO A DIFFERENT COMPUTER
B. REWRITING APPLICATION SOFTWARE
C. WRITING A NEW OPERATING SYSTEM
Y. PROJECT WAS NOT A MAJOR MODIFICATION TO AN EXISTING SYSTEM
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																										YES				
01 B				YES			YES										YES			YES		YES				YES	YES			
01 C					YES							YES								YES					YES					
01 Y	NON	NON	NON			NON		NON	NON	NON	NON		NON	NON	NON	NON		NON	NON		NON			NON	NON	NON			NON	NON	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A												YES														YES				YES
01 B	YES								YES				YES	YES	YES	YES								YES	YES	YES		YES		YES
01 C	YES											YES																YES		
01 Y		C04	C01	NON	C01	C01	NON	C01	NON	C01	C01						NON	C03	C04	C01	C01	C01	NON				C01		C01		

QUESTION 5 THE SOFTWARE PRODUCT WAS DESIGNED FOR:

A. COMMERCIAL OFF-THE-SHELF COMPUTER HARDWARE
B. COMMERCIAL OFF-THE-SHELF OPERATING SYSTEM
C. MODIFIED COMMERCIAL OFF-THE-SHELF COMPUTER HARDWARE (ADDED)
D. MODIFIED COMMERCIAL OFF-THE-SHELF OPERATING SYSTEM
E. SPECIAL PURPOSE COMPUTER (HARDWARE) SYSTEM (ADDED)
F. SPECIAL PURPOSE OPERATING SYSTEM
Z. OTHER

RESPONDON PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES	YES		YES	YES	YES	YES	YES		YES	YES			YES	YES	C04		YES	YES	C03	YES	C04	YES				YES
01 B					YES		YES	YES			YES										YES				C04					YES
01 D									YES											C02		YES						YES		
01 E	C03	YES	YES			YES						YES			YES	YES				YES						YES	YES	C01	YES	
01 F	C03		YES							YES		YES					YES							YES						

RESPONDON PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			YES		YES	YES			YES			C04					YES	YES		YES	YES			YES	YES	YES	YES	C04	YES	YES
01 B									YES											YES						YES	YES			YES
01 C	YES	YES						C02																						
01 D	YES	YES						C03										C04						YES			YES			
01 E				YES	YES		C03		YES	YES	YES		C03	YES	YES	YES			YES			YES	YES							
01 F	YES			YES					YES		YES	YES					YES								YES			YES		

QUESTION 6

IF THE SOFTWARE SYSTEM WAS BEING DEVELOPED FOR COMMERCIAL (COMPUTER) HARDWARE, WAS SELECTION AND DELIVERY OF THE COMMERCIAL HARDWARE PART OF THE OVERALL PROJECT? (ADDED)

A. YES
B. NO
C. NO, FURNISHED BY USER (ADDED)
Y. SYSTEM WAS NOT DEVELOPED FOR COMMERCIAL OFF-THE-SHELF COMPUTER HARDWARE
Z. COMMENT

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A								YES		YES	YES		YES	YES			YES				YES		YES	YES		YES				
01 B				YES	YES		YES		YES											C01	C01		YES		YES	YES				YES
01 Y	C01	NON	NON			C01									NON			NON	C01			NON					C01	NON	C01	

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			YES		YES	YES			YES								YES	YES			YES									
01 B									YES											YES				YES	YES	C01			YES	YES
01 C	C02						C04																				C02	C02		
01 Y		C01		NON				C01		NON	C01	NON	NON	NON	NON	NON			NON			NON	NON							

QUESTION 7

IF OFF-THE-SHELF (COMPUTER) HARDWARE WAS USED, IN WHAT MODE OF OPERATION DID THE PRODUCTION SYSTEM RUN? (ADDED)

A. BATCH
B. REMOTE BATCH/REMOTE JOB ENTRY TERMINAL (RJET)
C. INTERACTIVE PROCESSING (REAL TIME) (ADDED)
D. TRANSACTION PROCESSING
E. STAND ALONE
Y. SYSTEM WAS NOT DEVELOPED FOR COMMERCIAL, OFF-THE-SHELF COMPUTER HARDWARE
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES				YES					C03					YES	YES	YES				YES						YES
01 B																								YES						
01 C					YES		YES			C03	C03		C03	YES							YES	YES	C03		YES	YES				
01 D								YES									YES				YES									
01 E									YES																			YES		
01 Y		NON	NON			NON					C01			NON	C01												C01		C01	
01 Z																				OTH										

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					YES			YES				YES								YES				YES	YES			YES	YES	YES
01 B																		C03			YES			YES		YES				
01 C	C02		C03				C03		C03									C03		YES	C03			YES	C03	YES	YES	YES		
01 D																											YES			
01 E						YES											YES				YES									
01 Y		C01		NON				NON		NON	C01		NON	NON	NON	NON			NON			C03	NON							

QUESTION 8 IF THE TARGET (PRODUCTION) COMPUTER FOR THIS SOFTWARE CAPABILITY WAS AN OFF-THE-SHELF COMMERCIAL SYSTEM:
A. GIVE MANUFACTURER, MAKE, AND MODEL
B. GIVE OPERATING SYSTEM EMPLOYED
Y. TARGET COMPUTER WAS NOT A COMMERCIAL COMPUTER
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A1				N/S	DEL		DEL	DEL	DEL	DEL	DEL		DEL	DEL			DEL	DEL	DEL		DEC	CDC	SEL	CDC	DEL	N/S				UNI
01 A2				N/S	GMI		GP6	GP4	GMI	GMI	GMI		GP7	GMI			GMI	GP6	N/S		GMI	GP6	GMI	GP7	GP7	N/S				GP4
01 A3							DEL										DEL													
01 A4							GP7										GMI													
01 B1				N/S	DEL		DEL				DEL		DEL				INH		DEL		DEC	SDC	SEL	CDC	DEL	N/S				UNI
01 B2				N/S	GOS		GOS				GOS		GOS				SOS		GOS		RSX	SYM	RTM	SCO	GOS	N/S				IMS
01 Y	NON	NON	NON			NON						C01			NON	C01				NON							C01	NON	C01	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A1	IBM		DEL		N/S	ZER			HCS			UNI					ZER	HPK		DEL	DEL			DEL	DEL	DEL	IBM	CDC	CDC	CDC
01 A2	GP6		GMI		GMI	GP4			GMI			GP7					GP4	GMI		GMI	GMI			GP7	GP7	GP7	GP7	GP6	GP6	GP5
01 A3						HCS			IBM																					
01 A4						GMI			GP7																					
01 B1	IBM		DEL			ZER											ZER	HPK		DEL	DEL			DEL	INH	DEL	IBM	CDC	CDC	CDC
01 B2	OSM		GOS			GOS											RPM	RTE		GOS	GOS			GOS	SOS	GOS	SVS	SCO	SYS	SCO
01 Y		C01		NON			C04	NON		NON	C01		NON	NON	NON	NON			NON			NON	NON							

QUESTION 9

IF THE HOST (DEVELOPMENT) COMPUTER FOR THIS SOFTWARE CAPABILITY WAS AN OFF-THE-SHELF COMMERCIAL SYSTEM:
A. GIVE MANUFACTURER, MAKE AND MODEL
B. GIVE OPERATING SYSTEM EMPLOYED
Y. HOST COMPUTER WAS NOT A COMMERCIAL COMPUTER
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A1				IBM	DEL		DEL		DEL	DEL	DEL		DEL	DEL			DEL	DEL	DEL		HIS	CDC	SEL	CDC	DEL	N/S				IBM
01 A2				GP4	GMI		GP7		GMI	GMI	GMI		GP7	GMI			GMI	GP6	N/S		GP6	GP6	GMI	GP7	GP7	N/S				GP5
01 B1				IBM	DEL		DEL				DEL		DEL						IBM		HIS	SDC	SEL		DEL	N/S				IBM
01 B2				DVS	GOS		GOS				GOS		GOS						GOS		GCO	SYM	RTM		GOS	N/S				DVS
01 Y	NON	NON	NON			C04		NON				C01			C04	C01				NON								C01	C04	C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A1	IBM		DEL		N/S	ZER			HCS			UNI					ZER	N/S		DEL	DEL			DEL	DEL	DEL	IBM	CDC	CDC	CDC
01 A2	GP6		GMI		GMI	GP4			GMI			GP7					GP4	GMI		GMI	GMI			GP7	GP7	GP7	GP7	GP6	GP6	GP5
01 A3						HCS			IBM																					
01 A4						GMI			GP7																					
01 B1	IBM		DEL			ZER											ZER	HPK		DEL	DEL			DEL	INH	DEL	IBM	CDC	CDC	CDC
01 B2	OVT		GOS			GOS											RPM	RTE		GOS	GOS			GOS	SOS	GOS	SVS	SCO	SYS	SCO
01 Y		C01		NON			C04	NON		C04	C04		NON	NON	NON	NON			C04			NON	C02							

QUESTION 10

IF THE SOFTWARE SYSTEM WAS DEVELOPED FOR SPECIAL PURPOSE HARDWARE, WAS THE HARDWARE DEVELOPMENT PART OF THE OVERALL PROJECT?
A. YES
B. NO
Y. SYSTEM WAS NOT DEVELOPED FOR SPECIAL PURPOSE HARDWARE.
Z. COMMENT:

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES				YES						YES	YES		YES	YES	YES				YES	YES		YES			YES		YES	YES	
01 B	YES		YES																								C02			
01 Y				NON	NON		NON	NON	NON	C01				NON				NON	C01	C01			NON		NON	C01				NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES		C03	C04	YES	YES	YES		YES	YES	YES	YES			YES			YES	YES							
01 B	YES	YES																YES												
01 Y			C04			C01						C01					NON			NON	C01			NON	NON	C01	C01	C04	C01	NON

QUESTION 11

IF THE SOFTWARE SYSTEM WAS DEVELOPED FOR SPECIAL PURPOSE HARDWARE
WHAT TYPE WAS THIS?
A. EMBEDDED CENTRAL PROCESSOR
B. SPECIAL TERMINALS SUCH AS THOSE EMPLOYED IN COMMAND AND CONTROL AND AIRBORNE SYSTEMS, ETC.
C. SPECIAL SYSTEMS SUCH AS RADAR SENSORS, OR PROCESS CONTROL DEVICES, TRAINERS, ETC.
Y. SYSTEM WAS NOT DEVELOPED FOR SPECIAL PURPOSE HARDWARE
Z. OTHER

	RESPONDOR																										
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES				YES								YES	C02	YES	C02			YES						YES	YES	C04		
01 B		YES	YES																	YES	YES		C02			YES				
01 C		YES								YES	YES						C02									YES				
01 Y	NON			NON	NON		NON	NON	NON	C01				NON				C01	C01			NON		NON	C01				NON
01 Z																				OTH								OTH	

	RESPONDOR																													
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES		YES				C04	YES	YES			YES	YES	YES	YES						YES	YES							
01 B	YES	YES		YES			YES	C04			YES								YES			YES	YES							
01 C	YES	YES			YES		YES	C04					YES	YES	YES	YES						YES	YES							
01 Y			C01			C01						NON						NON		NON	C01			NON	NON	C01	C01	C04	C01	NON
01 Z																		OTH				OTH	OTH							

QUESTION 12

IF A HOST (DEVELOPMENT) COMMERCIAL HARDWARE SYSTEM WAS USED
IN DEVELOPING THIS SPECIAL PURPOSE CAPABILITY:
A. GIVE MANUFACTURER, MAKE, AND MODEL
B. GIVE OPERATING SYSTEM EMPLOYED
C. SYSTEM WAS DEVELOPED ON SPECIAL PURPOSE COMPUTER
Y. SYSTEM WAS NOT DEVELOPED FOR SPECIAL PURPOSE HARDWARE (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A1						OTH						DEL			CDC	DEL												CDC	IBM		
01 A2						GMI						GMI			GP7	GP7												GP7	GP6		
01 A3												DEL				DEL															
01 A4												GMI				GP7															
01 B1												DEL			CDC												CDC			
01 B2												GOS			SCO												NOS			
01 B3												DEL																		
01 B4												GOS																		
01 C		YES	YES											YES					YES						YES			C01		
01 Y				C01	C01		C01	C01	C01	C01	C04		C04				C01	C02	C01		C01	C01	C04	C04	C02					NON
01 Z	OTH																													

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A1		GP6			N/S		IBM		MCS	CDC	IBM																			
01 A2		GP7			GMI		GP7		GMI	GP5	GP7																			
01 A3		DEL							IBM																					
01 A4									GP7																					
01 B1							IBM																							
01 B2							SOS																							
01 C			YES					C01					YES	YES	YES	YES		YES	YES			YES	YES	C04						
01 Y	C01		C01			C01					C04						C01			C04	C01				C01	C01	C01	C04	C01	C01

QUESTION 13 THE CUSTOMER OR USER WAS: (TAKEN PARTLY FROM COMPUTER DECISIONS APPLICATION FORM, JUNE 1977 ISSUE)

A. IN-HOUSE TO MY COMPANY OR MAJOR DIVISION
B. WITHIN MY PARENT ORGANIZATION
C. A MANUFACTURER OF COMPUTER HARDWARE
D. A MANUFACTURER OF OTHER THAN COMPUTER HARDWARE
E. A SOFTWARE HOUSE
F. AN ENGINEERING SERVICE AND TECHNICAL SUPPORT ORGANIZATION
G. THE GOVERNMENT: FEDERAL (NON-MILITARY), FEDERAL (MILITARY), STATE, COUNTY, MUNICIPAL
H. A UNIVERSITY OR EDUCATIONAL INSTITUTION
I. A COMPUTER SERVICE BUREAU, TIME-SHARING SERVICE BUREAU
J. AN ADP CONSULTANT AND/OR EDUCATION SERVICE
K. FINANCIAL: BANKING, INSURANCE, REAL ESTATE, SECURITIES, CREDIT
L. IN THE WHOLESALE OR RETAIL TRADE
M. IN MEDICAL OR LEGAL SERVICES
N. IN TRANSPORTATION SERVICES
O. UTILITIES: COMMUNICATIONS, ELECTRIC, GAS
P. FOREIGN GOVERNMENT (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES																				YES					
01 B							YES		YES					YES																
01 C					YES																									
01 D							YES																	C03						
01 G	YES	YES	YES				YES	YES		YES	YES	YES	YES		YES	YES	YES	C03	C03	YES	YES	YES	YES			YES	YES	YES	YES	
01 P				C02		C02																								C02

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					YES	YES												YES		YES	YES			YES	YES	YES			YES	YES
01 B																											YES			
01 G	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES		YES			YES		
01 H																									YES					
01 P																						C02								

QUESTION 14 WAS THE CUSTOMER PURCHASING THE SOFTWARE SYSTEM FOR OTHER USERS?

A. YES
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES	YES		YES			YES												YES	YES	YES	YES	YES	YES			YES		
01 B	YES			YES		YES	YES		YES	YES	YES	YES	YES	YES	C03	C01	YES	YES	YES							YES	YES		YES	YES

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES		YES			YES	YES			YES	YES						YES		YES		YES					YES	YES	
01 B	YES			YES		YES	YES			YES	C04			YES	YES	YES	YES	YES		YES		YES		YES	YES	YES	YES			YES

QUESTION 15

ARE (IS) THERE:
A. MULTIPLE USERS OF THE SYSTEM
B. ONLY ONE USER (ONE OR MORE LOCATIONS) (ADDED)
Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES	YES		YES		YES	YES	YES												YES		YES		YES			YES		
01 B	YES			C04		YES				C03	YES	YES	YES	YES	C03	C04	C03	YES	YES	YES		YES		YES		YES	YES		YES	YES

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES		YES					YES			C03	YES						YES	YES	YES	YES	C03	YES	YES			YES	YES	YES	
01 B		YES		YES	YES	YES	YES		YES	YES			YES	YES	YES	YES	YES								YES	YES				YES

QUESTION 16 UNDER WHICH OF THE FOLLOWING CONTRACT TYPES OR AGREEMENTS WAS THE SOFTWARE SYSTEM DEVELOPED? (AFPR, 1976)

A. FIRM FIXED PRICE
B. FIXED PRICE WITH ECONOMIC PRICE ADJUSTMENT
C. FIXED PRICE INCENTIVE
D. FIRM FIXED PRICE LEVEL OF EFFORT
E. COST
F. COST SHARING
G. COST PLUS INCENTIVE FEE
H. COST PLUS AWARD FEE
I. COST PLUS FIXED FEE
J. TIME AND MATERIALS
K. LABOR-HOUR
L. BASIC ORDERING AGREEMENT
Y. NO CONTRACT WAS USED (ADDED)
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A						YES								YES			YES	YES	YES											
01 B																														YES
01 E					YES		YES		YES																					
01 F															YES															
01 G												C03	YES			YES					YES	YES	YES							
01 H			YES									C03													YES	YES		YES		
01 I	YES	YES					YES			YES	YES									YES	YES								
01 J								YES																					
01 L				YES																									
01 X																											MIS		
01 Y																										COI			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A										YES							YES	YES				YES						YES		
01 C			YES																											
01 E													YES	YES						C03				YES	YES				YES
01 G		YES						YES	YES														YES					YES	
01 H											YES																			
01 I	YES			YES	YES	YES	YES								YES				YES							YES			
01 J																					YES									
01 K																C03								YES						
01 Y												C02																		

QUESTION 17 IF THE CONTRACT HAD AN INCENTIVE CLAUSE (FOR SOFTWARE), WHAT WAS THE INCENTIVE BASED ON? (ADDED)

A. REDUCED (OR MEETS) COST (ADDED)
B. EARLY (OR MEETS) DELIVERY (ADDED)
C. INCREASED PERFORMANCE (EXPLAIN HOW IT WAS MEASURED)
Y. CONTRACT DID NOT HAVE AN INCENTIVE CLAUSE
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																YES						YES	YES	YES						
01 B																						YES	YES		YES					
01 C												YES	YES									YES	COM		YES	YES				
01 X																												MIS		
01 Y	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON				NON	NON		C01	C01	NON	NON	NON					C01		C01	NON
01 Z																OTH														

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES					C03	YES														YES							
01 B								C03																			YES			
01 C																													YES	
01 Y	NON			NON	C01	C01	NON			NON	C01	NON	NON	NON	NON	NON	NON	C01	NON	NON	NON	NON		NON	C01	C01		NON		NON
01 Z			OTH																											

QUESTION 18

WHAT WAS THE TOTAL COST OF THE PROJECT TO THE CUSTOMER? (IF EXACT AMOUNT NOT AVAILABLE, PLEASE GIVE A RANGE OR EXPLAIN)
$----------

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	505	275	136	355	204	255	374	135	306	156	255	526	507	105	UNK	UNK	706	254	204	306	126	305	276	107	754	217	204	UNK	307	304

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	135	207	137	157	206	255	405	127	307	125	127	MIS	105	175	405	126	505	155	305	345	254	306	805	405	205	505	305	375	305	305

QUESTION 19 HOW MUCH OF THE TOTAL COST (ESTIMATED) WAS ATTRIBUTABLE TO THE PRODUCTION OF SOFTWARE, INCLUDING MACHINE TIME, PROGRAMMER SALARY,I (MANAGEMENT OF SOFTWARE DEVELOPMENT, OVERHEAD RELATED TO SOFTWARE), AND OTHER ADP OPERATING EXPENSES? (ADDED)

$++++++++++++++++

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	355	275	405	355	204	204	254	135	505	205	704	185	157	304	UNK	UNK	505	503	303	905	705	505	166	856	704	186	154	356	206	304

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	135	275	156	186	504	155	185	805	305	204	107	MIS	105	175	205	585	105	504	105	175	403	705	854	305	205	255	185	155	305	305

QUESTION 20 THIS PROJECT BEGAN (FIRST ASSIGNMENT) IN********** (MONTH, YEAR) AND ENDED, (OR WILL END) (SIGN OFF) IN ********** (MONTH, YEAR). (ADDED)

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	001	012	009	001	007	006	002	004	001	006	006	009	003	006	008	006	001	001	007	006	006	006	006	003	006	006	006	001	001	001
01 B	070	072	073	076	076	075	076	072	074	071	076	076	072	073	074	069	074	072	076	072	073	075	073	072	072	074	072	075	061	077
01 C	004	006	006	012	007	011	009	005	N/S	006	002	006	001	006	003	006	008	012	007	006	003	012	012	002	006	006	006	008	011	004
01 D	073	075	077	078	077	077	077	075	INF	074	078	079	079	076	076	073	075	072	077	079	078	076	076	079	075	080	074	078	064	078

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	009	006	009	010	007	006	006	008	003	008	003		007	002	001	006	004	006	008	001	009	003	006	006	006		008	004	010	005
01 B	071	067	074	073	068	071	073	077	075	075	073		073	075	075	069	071	070	075	076	076	074	073	072	075		074	074	074	076
01 C	009	006	009	007	006	007	066	003	010	011	003		004	003	005	006	012	006	011	012	010	006	004	006	006		001	010	005	011
01 D	073	083	076	083	071	075	075	082	076	077	080		077	078	077	077	073	072	077	077	077	076	075	076	078		077	076	076	077
01 X												MIS														MIS				

QUESTION 21 IN WHAT LANGUAGE WAS THIS DATA SYSTEM PROGRAMMED? IF MORE THAN ONE LANGUAGE WAS USED PLEASE INDICATE APPROPRIATE PERCENTAGES.

A. FORTRAN **********%
B. JOVIAL **********%
C. COBOL **********%
D. ASSEMBLER (UNSPECIFIED) (ADDED) **********%
E. CMS-2 (ADDED) **********%
F. PL/1 (ADDED) **********%
G. HIGHER ORDER LANGUAGE (UNSPEC) (ADDED) **********%
Z. OTHER **********%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A							100		060		060	010	095	100			010	100	100	075	001		060	090		020				
01 B			075																			100					090			
01 C				100				090																						100
01 D			025		100	100		010	040	100	040	090	005		100	010	090			025	099		040	010			100		100	
01 E	090	100																								080		010		
01 F																									100					
01 G																090														
01 Z	010																													

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	080	080	010			015		080				095						070	010	090	070			085	002	090		060		
01 B																						100							100	
01 C																											095			100
01 D	020	020	090	030	100	085	100	020	100	100	030		100	100	100	100	100	030	090	010	030			015	098	010	005	040		
01 E																							100							
01 G				070							070																			

QUESTION 22 IN TOTAL, APPROXIMATELY HOW MANY LINES OF SOURCE CODE WERE WRITTEN?
A. EXECUTABLE
B. COMMENTS
C. OTHER NON-EXECUTABLE

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	203	154	304	853	103	602	203	423	603	563	573	502	125	103	153		603	501	502	303	504	104	504	105	104	264	402	202	453	183
01 B	103	503	303		103	302	502		104		603				153		103	500	501				401	105			801	102		702
01 C		503			502	202	502	233		502	103				602		303	500	501		504		302					152		
01 X																MIS														

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	503	304	503	104	303	203	163	633	413	402	304		403	303	802	203	143	504	503	144	402	704	513	254	504	104	253	204	653	704
01 B	503		963	503	202		123			202			302		102	203			114	203	501	184			104	303			753	
01 C	203			502		103	202			202	104				102	153				103			393		503		203		203	
01 X												MIS																		

QUESTION 23 USING TABLE 1 ON THE FOLLOWING PAGE PLEASE ESTIMATE THE COMPLEXITY OF THE DATA SYSTEM (FROM 12 TO 60). ALL DESCRIPTIONS PERTAIN TO SOFTWARE ONLY. THE COMPLEXITY RATING;**********

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	053	049	041	048	050	014	040	038	046	039	041	040	050	050	041	046	047	020	060	046	053	043	057	049	049	044	038	036	054	024

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	039	050	045	045	041	048	050	049	046	028	039	MIS	045	047	039	047	043	042	048	036	028	048	044	041	048	040	042	045	043	041

QUESTION 24 APPROXIMATELY HOW LARGE A DATA BASE WAS THE SYSTEM DESIGNED FOR?
(FILL IN BLANK WITH NUMBER OF BYTES OF DATA)**********

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	205	104	605	107	188	202	306	105	108	403	503	103	304	MIS	202	N/A	303	104	404	203	108	805	405	505	508	MIS	303	602	MIS	205

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	104	UNK	803	305	N/A	246	N/A	105	MIS	502	404	MIS	103	103	104	N/A	503	104	203	603	404	304	302	106	INF	MIS	507	MIS	246	305

QUESTION 25 WHO PREPARED THE REQUIREMENT SPECIFICATIONS?

A. THE CUSTOMER
B. AN ORGANIZATION AFFILIATED WITH THE CUSTOMER, BUT NOT THE CUSTOMER HIMSELF
C. YOUR ORGANIZATION, E.G., A TWO-STEP PROCUREMENT, AN UNSOLICITED PROPOSAL, ETC.
D. AN OUTSIDE CONSULTING FIRM
E. A THIRD CONTRACTOR, E.G., AN INTEGRATING CONTRACTOR
Y. NONE PREPARED (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A										YES	YES											YES			YES	YES			YES	
01 B		YES	YES																		YES		YES		YES		YES			
01 C				YES	YES	YES	YES	YES				YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	C03	C03					YES		YES
01 E	YES								YES															C03						

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			YES				YES			YES		C03						YES			YES			YES						YES
01 B					YES						YES											C03			YES	YES	YES		YES		
01 C	YES	YES		C03		YES	YES	C03	YES		C01		YES	YES	YES	C03	YES		YES	YES		YES	YES						YES	YES	

QUESTION 26 IF YOUR ORGANIZATION PREPARED THE REQUIREMENT SPECIFICATIONS DID THE CUSTOMER PARTICIPATE?

A. YES
B. NO (CUSTOMER DID NOT PARTICIPATE) (ADDED)
C. NO, CUSTOMER WAS SOURCE (ADDED)
Y. NOT APPLICABLE, YOUR ORGANIZATION DID NOT PREPARE SPECS (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				C04		YES	YES					YES	YES	YES		YES					YES		YES	YES			YES			YES
01 B					YES										YES		YES	YES	YES									YES		
01 C								C02		C01	C01														C01		C04	C01		C01	
01 X									C01											MIS										
01 Y	C01	C02	C02																											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES			YES	YES				YES		YES	YES			YES	YES		YES	YES						YES	YES	YES
01 B						YES				YES			YES			YES														
01 C			C04				YES		YES		YES								YES		YES		YES							
01 Y					NON																				NON	NON	NON			

QUESTION 27 ON A SCALE OF 1 TO 7, WITH 1 BEING LITTLE MORE THAN THE NAME OF THE SYSTEM, AND 7 BEING COMPLETE SPECIFICATIONS DOWN THROUGH PRELIMINARY DESIGN, HOW DETAILED WERE THE SPECIFICATIONS PROVIDED?

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	005	007	005	002	005	007	002	007	007	004	003	007	006	002	005	007	004	001	001	006	005	003	007	007	005	006	003	004	MIS	001

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	005	003	004	003	003	005	005	005	007	005	005	MIS	005	006	003	006	005	004	007	003	003	007	002	005	005	004	003	006	004	005

QUESTION 28

WAS IT NECESSARY TO REWRITE THE SPECIFICATIONS BEFORE PROCEEDING WITH DESIGN?

A. YES (SPECIFY PERCENT REWRITTEN)
B. NO (SPECIFICATION WERE ADEQUATE) (ADDED)
C. YES, HOWEVER SPECIFICATIONS NEVER REWRITTEN (ADDED)
D. YES, REWRITTEN CONCURRENT WITH DESIGN (ADDED)
Y. N/A, REQUIREMENT SPECIFICATIONS WERE NEVER WRITTEN (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		020				020		030	060	060	080	020		050		095	050			020	100		100	050	050	015	020		050	100
01 B	YES				YES		YES						YES						YES	YES		YES						YES		
01 C			C04																											
01 D				C02											C02															

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				080		015	010		025	020	030	030			090		025	050	100			020	040	040	020		075	020	030	050
01 B		YES	YES		YES			C03					YES	YES		YES				YES	YES					YES				
01 X	UNK																													

QUESTION 29

IF IT WAS NECESSARY TO REWRITE THE SPECIFICATIONS, WHAT WAS THE REASON? (ORIGINALLY NARRATIVE)

A. ERRORS IN SPECIFICATION
B. SPECIFICATIONS WERE AMBIGUOUS, INCOMPLETE, AND/OR INCONSISTENT
C. CHANGE IN SCOPE OF PROJECT
D. CHANGE IN REQUIREMENTS OF PROJECT
E. CHANGE IN HARDWARE DESIGN
F. NORMAL WAY OF DOING BUSINESS
G. CUSTOMER AND/OR DEVELOPER BECAME BETTER INFORMED
Y. WAS NOT NECESSARY TO REWRITE SPECIFICATIONS OR REQUIREMENT SPECIFICATIONS WERE NOT PREPARED.
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		C02																			C02									
01 B			C02	C02					C02	C02	C02	C02											C02				C02		C02	C02
01 C			C02			C02								C02	C02									C02		C02				
01 D				C02						C02		YES			C02					C02				C02	C02		C02			
01 E									C02												C02									
01 F																C02														
01 G				C02				C02									C02													
01 Y	C01				C01		C01						C01					C01	C01			C01						C02		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A									C02	C02													C02	C02	C02					C02
01 B				C02								C02			C02							C02			C02		C02		C02	
01 C																		C02						C02						
01 D						C02			C02								C02					C02								
01 F											C02	C02																		
01 G							C02		C02	C02	C02								C02					C02				C02		C02
01 X	UNK																													
01 Y		C01	C01		C01			C01					C01	C01		C01				C01	C01					C01				

QUESTION 30 THE SPECIFICATIONS WERE PREPARED:

A. USING TOP-DOWN (HIERARCHY OF FUNCTION) TECHNIQUES
B. USING STRUCTURED DESIGN/FLOW TECHNIQUES
C. IN PHASES, WITH DESIGN AND CODING STARTED BEFORE THE REQUIREMENT SPECIFICATION WAS COMPLETED
D. IN A FORMAL REQUIREMENT LANGUAGE (DESCRIBE)
E. IN SUCH A MANNER AS TO FACILITATE TRACKING THE DEVELOPMENT OF SOFTWARE FROM REQUIREMENTS THROUGH CODING AND TIE EACH DELIVERED SOFTWARE MODULE TO SOME PART OF THE REQUIREMENTS. (APPROXIMATELY++++++++++X OF THE REQUIREMENT COULD BE TRACKED)
F. IN PRECISE, MEASUREABLE TERMS TO AID IN DEVELOPMENT OF ACCEPTANCE TESTING (APPROXIMATELY++++++++++X OF THE REQUIREMENTS COULD BE MEASURED)
G. ACCORDING TO MIL-STDS (ADDED)
Y. SPECIFICATION NEVER PREPARED/NONE (ADDED)
Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES										YES	YES				YES					YES	YES	YES		YES	YES	C02			
01 B								YES								YES											C02			
01 C			YES	YES	YES					YES	YES		YES		YES		YES													YES
01 E						095		YES				YES				100		YES	090	090		YES		100				070		
01 F													YES			099								095				080		
01 G		C02										C02																		
01 X														MIS																
01 Y			C02																											
01 Z							OTH					OTH																C02		

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			YES						YES		YES	YES				C02		YES						YES	YES				YES	YES
01 B										YES	YES											C04		YES	YES			YES		
01 C	YES			YES									YES	YES					YES	YES			YES	YES	YES	PDL	YES			
01 D																								YES	YES					
01 E		YES			080	090	080		100						090	080	100							YES					080	
01 F									090						080									YES						
01 G								C04																						
01 Z			OTH																		OTH									

QUESTION 31

THE FOLLOWING IS A LIST OF DOCUMENTATION THAT MAY BE REQUIRED BY A SOFTWARE DEVELOPMENT CONTRACT. CHECK EACH DOCUMENT REQUIRED IN THE PROJECT AND ADD REQUIRED DOCUMENTATION NOT CONTAINED IN THE LIST (DOD MANUAL 4120.17M, DEC 1972)

A. OBJECT LISTING/DECK/TAPE
B. SOURCE LISTING/DECK/TAPE
C. FUNCTIONAL DESCRIPTION--INITIAL DEFINITION OF A PROJECT WHICH PROVIDES THE ULTIMATE USER WITH A CLEAR STATEMENT OF THE OPERATIONAL CAPABILITIES TO BE DEVELOPED (ALSO SOMETIMES CALLED REQUIREMENTS SPECIFICATIONS).
D. DATA REQUIREMENTS DOCUMENT--PREPARED BY BOTH SYSTEM AND USER PERSONNEL WHEN A DATA COLLECTION EFFORT BY THE USER GROUP IS REQUIRED TO GENERATE AND MAINTAIN SYSTEM FILES.
E. SYSTEM/SUBSYSTEM SPECIFICATION--PREPARED FOR SYSTEM PERSONNEL, AS DETAILED AS POSSIBLE, CONCERNING THE ENVIRONMENT AND DESIGN ELEMENTS, IN ORDER TO PROVIDE MAXIMUM GUIDANCE TO THE PROGRAM DESIGN EFFORT; ALSO DEFINES SYSTEM/SUBSYSTEM INTERFACES.
F. PROGRAM SPECIFICATIONS--PREPARED FOR PROGRAMMERS; CONTAINS CONSIDERABLE DETAIL FOR THE PURPOSE OF GUIDING PROGRAM DEVELOPMENT
G. DATA BASE SPECIFICATION--PREPARED FOR PROGRAMMERS IN SUFFICIENT DETAIL TO PERMIT PROGRAM CODING AND DATA BASE GENERATION BY THE PROGRAMMING GROUP.
H. USERS MANUAL--TO PRESENT GENERAL AND SPECIFIC INFORMATION ON HOW A SPECIFIC COMPUTER PROGRAM WILL BE USED (INCLUDES POSITIONAL HANDBOOK FOR REMOTE INPUT TERMINALS) (ADDED)
I. COMPUTER OPERATIONS MANUAL--CONTAINS PRECISE DETAILED INFORMATION ON THE CONTROL, REQUIREMENTS AND OPERATING PROCEDURES NECESSARY TO SUCCESSFULLY INITIATE, RUN, AND TERMINATE THE SUBJECT SYSTEM.
J. PROGRAM MAINTENANCE MANUAL--CONTAINS GENERAL AND SPECIFIC INFORMATION FOR COMPUTER PERSONNEL RESPONSIBLE FOR THE MAINTENANCE OF THE COMPUTER PROGRAMS.
K. TEST AND IMPLEMENTATION PLAN--CONTAINS AN ORDERLY SCHEDULE OF EVENTS AND LISTS OF MATERIAL NECESSARY TO AFFECT TESTING AND DELIVERY OF A COMPLETE DATA PROCESSING SYSTEM.
L. TEST ANALYST REPORT--DESCRIBES THE STATUS OF THE COMPUTER PROGRAM SYSTEM AFTER TEST AND PROVIDES A PRESENTATION OF DEFICIENCIES FOR REVIEW BY STAFF AND MANAGEMENT PERSONNEL.
M. SOFTWARE DEVELOPMENT PLAN (ADDED)
N. SOFTWARE STANDARDS AND REQUIREMENTS (ADDED)
O. MANAGEMENT REPORTS (ADDED)
P. INTERFACE CONTROL (ADDED)
Q. BUDGET (ADDED)
R. PROGRESS REPORTS (ADDED)
S. ERROR/DISCREPANCY REPORT (ADDED)
T. PROGRAM CHANGE REQUESTS/STATUS (ADDED)
U. VERSION DESCRIPTION (ADDED)
V. SOFTWARE PRODUCT/OUTPUT SPECIFICATIONS (ADDED)
Y. DOCUMENTATION NOT REQUIRED (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES		YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES	YES	YES	YES
01 C		YES		YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES			YES	YES	YES		YES	YES	YES	YES	YES		
01 D		YES		YES			YES	YES	YES				YES	YES		YES	YES			YES	YES	YES		YES	YES				YES	YES
01 E	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES		YES	YES	YES	YES			YES	YES	YES	YES	YES	YES		YES			YES
01 F	YES	YES		YES	YES	YES		YES	YES		YES	YES	YES			YES				YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 G		YES		YES		YES	YES		YES							YES	YES			YES	YES	YES	YES	YES	YES					
01 H		YES	YES	YES	YES	YES	YES	YES	YES		YES		YES	YES		YES	YES	YES		YES	YES			YES	YES		YES	YES	YES	YES
01 I		YES		YES	YES	YES			YES				YES		YES	YES	YES	YES		YES		YES	YES	YES	YES			YES	YES	YES
01 J	C03	YES		YES	YES	YES			YES							YES	YES			YES		YES	YES		YES					YES
01 K	YES	YES	YES	YES	YES	YES		YES	YES		YES	YES	YES	YES		YES				YES	YES	YES	YES	YES	YES		YES	YES		YES
01 L	YES	YES	YES	YES	YES	YES			YES				YES			YES				YES			YES	YES	YES		YES	YES		
01 M													C02							C02			C02							
01 N													C02																	
01 O																							C02							
01 P																							C02							
01 Q																C02														
01 R																C02														
01 Z															OTH															

PART/SUB	RESPONDUN 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES		YES	YES	YES	YES	YES		YES	YES		YES		YES			YES	YES	YES	YES
01 B	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES
01 C	YES	YES	YES	YES	YES	YES	YES			YES	YES			YES	YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	
01 D		YES		YES		YES		YES			YES				YES			YES	YES			YES			YES	YES	YES	YES	YES	YES
01 E	YES	YES	C04	YES		YES		YES			YES		YES	YES	YES			YES		YES		YES		YES	YES	YES	YES	YES	YES	YES
01 F	YES	YES		YES	YES	YES		YES			YES		YES				YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES
01 G		YES		YES		YES					YES		YES		YES		YES		YES			YES		YES	YES	YES	YES		YES	YES
01 H	YES	YES	YES	YES	YES	YES	YES	YES			YES						YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES
01 I	YES	YES	YES	YES		YES		YES			YES				YES		YES	YES	YES	YES		YES		YES			YES	YES	YES	YES
01 J		YES		YES	YES						YES				YES				YES					YES		YES	YES	YES		YES
01 K	YES	YES		YES		YES	YES	YES			YES			YES	YES	YES	YES		YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES
01 L	YES	YES		YES		YES		YES			YES			YES	YES	YES	YES		YES		YES	YES		YES	YES		YES	YES		YES
01 M						C02		C02												C02										C02
01 O	C02																													
01 Q	C02																													
01 S							C02							C02																
01 T	C02						C02							C02																
01 U	C02							C02																						
01 V	C02		C02											C02																
01 Y									C02																					
01 Z								OTH															OTH					OTH		

QUESTION 12 WHICH OF THE FOLLOWING WERE SPECIFIED BY THE CUSTOMER?

A. A SPECIFIC COMPUTER (THIS WAS<<<<<<<<<<<<<<<<<<<<<<<<<<<<<)
B. STORAGE LIMITATION (THESE LIMITATIONS WERE<<<<<<<<<<<<<<<<<<<<)
C. SPEED CONTRAINTS (EXPLAIN)
D. A SPECIFIC LANGUAGE (THIS LANGUAGE WAS<<<<<<<<<<<<<<<<<<<<<<)
E. HIS PARTICIPATION IN THE DESIGN FUNCTION
F. HIS PARTICIPATION IN THE CODING FUNCTION
G. PRIORITIZED REQUIREMENTS
H. DEVELOPMENT UNDER LIFE-CYCLE COSTING CONCEPTS
I. DEVELOPMENT UNDER DESIGN-TO-COST CONCEPTS
J. DEVELOPMENT UNDER MODERN PROGRAMMING TECHNIQUES
K. PORTABILITY
L. HUMAN ENGINEERING
M. SECURITY
N. SAFETY
O. MIL-S-52779
P. MODIFIED MIL-S-52779 (HOW MODIFIED)
Q. TYPES OF REVIEW
R. FREQUENCY OF REVIEW
S. INPUT DATA
T. OUTPUT REQUIREMENTS
U. TEST PLAN/PROCEDURE
V. A PARTICULAR RELIABILITY FIGURE TO ATTAIN (IF SO, WHAT METHOD OF MEASURING SOFTWARE RELIABILITY DID THE CUSTOMER SPECIFY?)
W. A MAINTAINABILITY GOAL TO ATTAIN (IF SO, WHAT METHOD OF MEASURING SOFTWARE MAINTAINABILITY DID THE CUSTOMER SPECIFY?)
AA. A FOLLOWUP MAINTENANCE CONTRACT (TIME IN MONTHS)
BB. CUSTOMER TRAINING
CC. A WARRANTY OF THE SOFTWARE FOR A PERIOD OF TIME (GIVE TIME IN CALANDAR MONTHS)
Y. CUSTOMER DID NOT SPECIFY (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A1	N/S	N/S		IBM				DEL	DEL		DEL							DEL	DEL		DEC			CDC			GEC			UNI
01 A2	SLG	SMI		GPS				GP4	GMI		GMI							N/S	N/S		GMI			GP7			GMI			GP4
01 AA	060		YES					012		BOA	YES													024				YES		
01 B	963	653	YES									50%						400		YES				504			143	YES	323	
01 BB			YES			YES		YES		YES	YES						YES				YES		YES		YES					
01 C	YES	NIS										75%						YES		10%		YES	SRT	5-2	SRT		8-6	80%		
01 CC																012														
01 D	CMI	CMI	JOV	COB									FOR					FOR		FOR		JOV		FOR		CMI	ASS	YES		COB
01 E	YES	YES	YES					YES		YES	YES	YES		YES		YES					YES				YES					
01 F		YES	YES					YES				YES		YES																

01	G		YES								YES			YES					YES						YES			YES			
01	H		YES												YES				YES												
01	I					YES																		YES							
01	J		YES								YES	YES												YES		YES		YES			
01	K				YES		YES																			YES					
01	L					YES	YES			YES	YES				YES				YES		YES		YES							
01	M							YES							YES				YES		YES		YES				YES			
01	N					YES																								
01	O																	YES												
01	P																	5.2												
01	Q	YES	YES	YES	YES				YES		YES	YES	YES		YES	YES		YES	YES	YES	YES	YES	YES		YES	YES					
01	R		YES	YES	YES				YES		YES	YES	YES		YES			YES		YES		YES	YES							
01	S	YES	YES	YES				YES		YES								YES	YES	YES	YES	YES	YES		YES			YES		
01	T	YES		YES			YES	YES	YES	YES								YES		YES	YES	YES	YES		YES		YES	YES		
01	U		YES								YES	YES							YES							YES				
01	V		MTB													YES			HWR	SET	HWR									
01	Y					CO2									CO2															

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A1	IBM		N/S	N/S			IBM				IBM		IBM	IBM	LIT					DEL			N/S					CDC	CDC	CDC
01 A2	GP6		SMI	SLG			SMI				SMI		SMI	SMI	SMI					GMI			SLG					GP6	GP6	GP4
01 A3													LIT	LIT																
01 A4													SMI	SMI																
01 AA							YES	YES			015				012													012	015	
01 B		PCT	YES	643				YES			70%												483	YES					246	
01 BB																YES		YES							YES			YES	YES	YES
01 C	YES	PCT	YES	RTS			2-2			SRT	15%						SRT					SRT				YES	202	202		SRT	YES

| | | |

QUESTION 33 IF YOU COULD AFFECT THE METHOD BY WHICH REQUIREMENTS WERE SPECIFIED, OR WERE ABLE TO INITIATE RESEARCH INTO IMPROVING THE REQUIREMENTS SPECIFICATION FUNCTION, WHAT ACTION WOULD YOU TAKE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	R2A	C1G	R7A	R11	MIS	R3B	R1P	MIS	CVD	MIS	R1B	R7D	MIS	MIS	R1J	MIS	R7B	MIS	R11	MIS	R1C	MIS	R4A	R1A	RRA	MIS	RRB	R9F	R4D	R1F
01 002	R3A	R1J	CTE			R3C	R1F		CVE		R9A	R1N			CME						R1J		R4B	R1B				R9E	D66	CMD
01 003							R1G								CMH						CMC		P4A					R2B	R4A	R1J
01 004																					CMA		P4B						R4C	
01 005																							P3B							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	MIS	R1M	R4C	MIS	CRA	RRA	R4A	R9F	MIS	R4G	R1J	R1J	X1C	MIS	04C	R7A	R1J	R7E	MIS	MIS	R7B	05D	R4C	MIS	R1J	071	D5A	P8A	R7A
01 002			R4A	R9A			CRC	R4B			R7F	P8A	X1F	X90			R7C	X7E	R9F					R7B		R4C	07A		R1C	R1D
01 003				R1G			RRC					P8H							D5A							R4B	R1L		R7G	CMB
01 004												R1K							DTH							R4F	R9A		R1F	R4C
01 005																										R4E			R1H	

QUESTION 34 WHO DID THE PLANNING BEFORE THE PROJECT WAS ASSIGNED TO A GROUP OR INDIVIDUAL FOR ACCOMPLISHMENT?

A. A (PERMANENT) PLANNING GROUP SET UP FOR THIS PURPOSE (ADDED)
B. AN AD HOC PLANNING GROUP (ADDED)
C. A STEERING COMMITTEE WHICH ESTABLISHED COSTS AND SCHEDULES
D. AN ON-GOING PROJECT (ADDED)
E. PROGRAM MANAGER WAS PICKED, AND HE DID THE INITIAL PLANNING
F. A STAFF FUNCTION
Y. NO PLANNING ACCOMPLISHED (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES	YES		YES											YES						YES			YES			YES		YE
01 B																					C03									C03
01 C				C04																										
01 E	YES	C03	C03	C03	C03	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES		YES	YES	YES	YES	
01 F																YES									C03	YES				

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES					YES		YES														YES					YES
01 B												C03										C03					C03			
01 C												YES	YES	YES													YES	YES	YES	
01 D									C02	YES																				
01 E	YES	YES	YES	C03	C03	YES	YES	YES	C03	C03	C03		C03	C03	YES	C03	YES	YES		YES	YES	YES	YES	YES	C03	YES		YES	C03	C03
01 F			YES		YES														YES											
01 Z																DTH														

QUESTION 35

IN PLANNING FOR THIS PROJECT DID/WAS:
A. THE PROJECT MANAGER USE A FORMAL PLANNING GUIDE?
B. THE CUSTOMER ACTIVELY PARTICIPATE IN THE PLANNING FUNCTION?
C. A WORK BREAKDOWN STRUCTURE (WBS) EMPLOYED IN PLANNING THE SOFTWARE DEVELOPMENT? (APPROXIMATELY HOW MANY LEVELS?)
D. THE PROJECT DIVIDED INTO SEPARATE PHASES FOR THE PURPOSE OF PLANNING
Y. NONE (ADDED)
Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES	YES					YES					YES			YES						YES					YES
01 B	YES												YES			YES				YES				YES	YES	YES	YES	YES		
01 C	006	004	005			YES	YES				004	001			001	YES				005		003	005	007		005				
01 D	YES		YES	YES			YES	YES	YES		YES			YES	YES	YES	YES	YES		YES	YES					YES	YES			
01 Y										C03																			C02	
01 Z																							OTH							

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																												YES		
01 B								YES		YES	YES		YES	YES	YES						YES			YES	YES	YES	YES		YES	
01 C		006	YES	004		003	YES	004	YES	003	004				004		003	003	005	YES		005	003		006			005	003	
01 D		YES	YES		YES	YES	YES		YES		YES	YES			YES					YES	YES	YES	YES		YES	YES	YES	YES		YES
01 X	MIS																													
01 Y																NON														
01 Z																						OTH								

QUESTION 36 WHAT TOOLS WERE USED IN PLANNING THE PROJECT?

A. PERT
B. MODIFIED PERT
C. CPM (CORK)
D. GANTT
E. WORKLOADING CHARTS
F. MILESTONE (ADDED)
G. CSCS (ADDED)
H. WBS (ADDED)
Y. NONE
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A													YES	YES							YES			YES						
01 B		YES	YES		YES	YES		YES								YES										YES				
01 C	C02																						YES							
01 D		YES	YES			YES				YES	YES	YES	YES		YES						YES			YES				YES		
01 E	YES	YES			YES	YES	YES	YES	YES		YES				YES	YES	YES	YES	YES			YES		YES	C02			YES		YES
01 F	C02																										C02			
01 G												C02	C02			C02								C02						
01 H	C01	C01	C01			C01	C01				C01	C01			C02	C01				C01		C01	C01	001	C01	C01				
01 Y				NON																								C02		
01 Z						OTH														OTH				OTH						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES																													
01 B						YES			YES		YES		YES	YES					YES	YES								YES	YES	YES
01 D				YES		YES		YES		YES			YES	YES		YES											YES	YES		YES
01 E	YES		C02	YES	YES			YES				YES			YES		YES	YES	YES	YES	YES			YES	YES		YES	YES		
01 F	C02																												C02	
01 G														C02																
01 H		C01	C01	C01		C01	C01	C01	C01	C01	C01				C01		C01	C01	C01	C01		C01	C01		C01			C01		
01 X																									MIS					
01 Y																NON							C02							
01 Z																			OTH							OTH				

QUESTION 57 WHAT METHOD WAS USED IN ESTIMATING THE COST AND SCHEDULE FOR THE PROJECT?

A. A FORMULA (TOP DOWN) (ADDED)
B. ESTIMATES BASED ON A SIMILAR PROJECT
C. PROVIDED BY SOMEBODY WHO HAS A KNACK FOR ESTIMATING CORRECTLY
D. BOTTOM-UP AGGREGATING (ADDED)
E. COST AND/OR SCHEDULE WERE DICTATED (ADDED)!
F. SIMULATION MODEL
G. CRYSTAL BALL (OR SIMILAR MEANS)
Y. COST AND SCHEDULE NOT ESTIMATED (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	C03				YES	YES		YES			YES	YES	YES		YES	YES	YES							YES		YES				YES
01 B			YES	YES		YES				YES	YES			YES	YES	YES			YES			YES	YES	YES		YES		YES	YES	YES
01 C				YES	YES																									YES
01 D	C03																				YES									
01 E															YES			YES	YES			C03			YES					
01 G							YES										YES									YES			YES	
01 Z													OTH			OTH							OTH							

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES					YES	YES	YES										YES	YES		YES	YES		YES		YES			YES
01 B		YES	YES	YES		YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES	YES	
01 C					YES	YES				YES							YES		YES								YES		YES	
01 D																										YES				
01 E			YES					YES										YES		YES		YES		YES				YES	YES	
01 F											YES																			
01 G	YES	YES																							YES					

QUESTION 38 IF THE FORMULA APPROACH (AND/OR OTHER ESTIMATING TECHNIQUE) WAS USED WHAT WERE THE ELEMENTS OR VARIABLES CONSIDERED (ADDED) (OLSEN 1977)

A. COMPUTER TIME
B. DOCUMENTATION
C. TRAINING
D. TRAVEL
E. SITE PREPARATION/CONSTRUCTION
F. RATIO MANAGEMENT & OVERHEAD TO PROGRAMMERS
G. KEYPUNCH
H. OFFICE SUPPLIES
I. OFFICE SPACE
J. PERSONNEL EQUIPMENT, I.E., DESKS, PENCILS, PAPER, ETC.
K. PROGRAMMER PROFICIENCY
L. PROGRAM COMPLEXITY/FUNCTION
M. TESTER PROFICIENCY
N. NUMBER OF MODULES (SUB ROUTINES)
O. LINES OF CODE (ADDED)
P. SIZE OF PROGRAM (ADDED)
Q. REQUIREMENT SPECIFICATION COMPLETENESS (ADDED)
R. CUSTOMER SUPPORT (ADDED)
S. HISTORICAL DATA (ADDED)
T. AVAILABILITY OF SUPPORT SOFTWARE (ADDED)
U. CALENDAR PERIOD (ADDED)
V. SIZE OF DATA BASE (ADDED)
W. EXPERIENCE (NEWNESS) WITH SYSTEM (ADDED)
Y. NOT USED
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES							YES							YES											YES				YES
01 B	YES					YES		YES			YES	YES												YES		YES				YES
01 C						YES		YES																		YES				YES
01 D	YES					YES		YES																		YES				YES
01 E						YES																								
01 F						YES		YES			YES													YES		YES				
01 G											YES																			
01 H						YES																								
01 K	YES				YES	YES		YES			YES																			YES
01 L	YES					YES		YES			YES	YES	YES		YES									YES						YES
01 M											YES													YES						
01 N	YES				YES	YES		YES			YES		YES				YES							YES						YES
01 O												C02	C02		C02									C02						C02
01 P																														

01	U					C02																							
01	W							C02																					
01	T					C02					C02																		
01	U										C02																		
01	V																						C02	C02					
01	X																MIS												
01	Y			NON	NON	NON			NON		NON	C01				NON				NON	C01	C01	C01	C01	C01			C01	NON	C01
01	Z							OTH						OTH															

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A							YES		YES			YES							YES		YES	YES	YES	YES	YES		YES			
01 B							YES					YES							YES	YES	YES	YES	YES	YES	YES		YES			YES
01 C							YES																YES		YES		YES			
01 D							YES											C02			YES	YES	YES		YES					YES
01 E							YES																		YES		YES			
01 F			YES				YES														YES	YES	YES		YES		YES			
01 G																					YES	YES	YES		YES		YES			
01 H							YES																							
01 I							YES																							
01 J							YES																							
01 K			YES						YES					YES	YES					YES			YES	YES	YES		YES			
01 L		YES	YES						YES			YES	YES					YES		YES	YES	YES	YES	YES	YES		YES			YES
01 M																							YES		YES		YES			
01 N		C02	YES						YES											YES	YES	YES	YES	YES	YES		YES			
01 O										C02													YES							C02
01 P		C02																C02	C02			L02								
01 S			C02										C02	C02																
01 W		C02																												
01 Y	NON			NON	C01	NON					NON	C01			NON	NON	NON									C01		NON	C01	
01 Z			OTH																											

QUESTION 39

AFTER THE ORIGINAL SOFTWARE DEVELOPMENT PLAN AND SCHEDULE WERE DETERMINED AND SUBMITTED FOR REVIEW BY SENIOR MANAGEMENT AND/OR CUSTOMER WAS:

A. THE DELIVERY DATE SHORTENED BY SENIOR MANAGEMENT
B. THE DELIVERY DATE SHORTENED BY THE CUSTOMER
C. THE DELIVERY DATE LENGTHENED BY SENIOR MANAGEMENT
D. THE DELIVERY DATE LENGTHENED BY THE CUSTOMER
E. THE DELIVERY DATE ORIGINALLY DICTATED (ADDED)
F. THE REQUIREMENTS CHANGED TO MATCH SCHEDULE (ADDED)
G. RESOURCES REDUCED (ADDED)
Y. NO CHANGE (ADDED)
Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A														YES								YES								YES
01 B		YES										C03																		
01 C															YES		C03													
01 D													YES										YES		YES					YES
01 E	C02				C02					C02									C01		C02						C02			
01 F									C02																					
01 G			C02																											
01 X																				MIS						MIS		MIS	MIS	
01 Y				C02	C02		C02	C02		C02						C02		C02						C02						

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A								C03	YES						YES			YES						YES				YES	
01 B																			YES					YES			YES			
01 C																								YES						YES
01 D														YES							YES			YES						YES
01 E			C01							C02		C02																C02		
01 F																										C02				
01 G													C02		C02															
01 X	UNK				MIS	MIS					MIS																			
01 Y		NON		C02			C02						C02			C02				C02		C02	NON		NON					
01 Z																	OTH													

QUESTION 40 IN THE PROCESS OF SOFTWARE SYSTEM DEVELOPMENT WHICH OF THE FOLLOWING PLANNING DOCUMENTS WERE PREPARED?

A. PROJECT MANAGEMENT
B. RESOURCE REQUIREMENTS
C. ORGANIZATION
D. STAFFING
E. TRAINING
F. TEST
G. SOFTWARE DEVELOPMENT
H. PHASE AND/OR DELIVERY
I. DOCUMENTATION
J. IMPLEMENTATION
K. DATA CONVERSION
L. CHANGE CONTROL
M. CONFIGURATION MANAGEMENT (ADDED)
N. REVIEW & REPORTING
O. PRODUCT ASSURANCE (ADDED)
P. WORK BREAKDOWN STRUCTURE (ADDED)
Q. BUDGET (ADDED)
Y. NONE
Z. OTHER

	RESPONDON																												
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES			YES	YES	YES								YES					YES	YES	YES	YES	YES	YES	YES	YES	YES	
01 B	YES	YES				YES		YES	YES		YES	YES				YES				YES		YES	YES	YES	YES			YES	YES	YES
01 C	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES		YES		YES				YES	YES		YES	YES		YES		YES	YES	
01 D	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES		YES					YES	YES	YES		YES				YES	
01 E	YES	YES						YES	YES							YES							YES		YES				YES	
01 F	YES	YES	YES		YES	YES		YES	YES	YES	YES	YES	YES	YES		YES				YES		YES	YES	YES	YES		YES	YES	YES	YES
01 G	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES			YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES
01 H		YES		YES	YES	YES		YES		YES				YES		YES						YES	YES			YES		YES	YES	
01 I	YES	YES			YES	YES		YES	YES				YES		YES	YES						YES	YES	YES	YES		YES	YES	YES	YES
01 J	YES	YES			YES	YES		YES		YES						YES							YES						YES	YES
01 K								YES															YES						YES	YES
01 L	YES	YES	YES			YES		YES	YES		YES	YES	YES			YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
01 M																								C02						

01	N	YES	YES			YES	YES		YES	YES		YES				YES	YES				YES		YES	YES	YES			YES	YES	YES		
01	O																							C02								
01	P																			C02											
01	Q																			C02											
01	Y																	NON	NON												

PART/SUB		RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01	A		YES	C03	YES		YES					YES						YES		YES			YES		YES	YES	YES		YES	YES	
01	B	YES	YES		YES		YES		YES			YES					YES		YES	YES						YES	YES	YES	YES	YES	
01	C	YES			YES		YES		YES			YES					YES	YES	YES	YES	YES		YES					YES	YES		
01	D	YES			YES	YES		YES	YES			YES					YES		YES		YES					YES		YES	YES	YES	
01	E	YES	YES		YES																			YES				YES	YES		
01	F	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES				YES	YES	YES			YES	YES				YES	YES	YES	YES	YES
01	G	YES	YES		YES		YES		YES	YES		YES			YES		YES	YES	YES				YES	YES	YES	YES	YES	YES	YES	YES	YES
01	H	YES	YES		YES		YES	YES	YES		YES		YES						YES							YES		YES	YES		
01	I	YES	YES		YES	YES	YES		YES		YES		YES	YES	YES	YES		YES	YES		YES		YES	YES		YES		YES	YES	YES	YES
01	J	YES			YES		YES		YES				YES				YES	YES	YES				YES		YES	YES	YES	YES	YES		YES
01	K										YES																	YES			YES
01	L	YES	YES		YES	YES	YES	YES	YES	YES		YES								YES	YES		YES	YES	YES	YES		YES		YES	
01	M	YES																										YES			
01	N				YES			YES	YES		YES		YES			YES					YES				YES	YES			YES	YES	YES
01	O	YES																										YES			
01	Q	YES																													

QUESTION 41 FROM PROJECT INCEPTION THROUGH DELIVERY OF THE COMPLETED SYSTEM, APPROXIMATELY WHAT PERCENT OF THE TIME WAS SPENT BY ALL PERSONNEL IN PLANNING FOR SOFTWARE? ----------%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	005	MIS	003	040	005	010	005	030	005	015	010	012	005	002	MIS	003	010	005	005	015	MIS	MIS	010	010	MIS	015	001	010	005

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	010	UNK	010	010	010	010	010	002	015	005	035	030	001	008	002	030	010	020	040	010	010	003	010	007	030	020	015	025	005	010

QUESTION 42

IN A FURTHER BREAKDOWN OF PLANNING ACTIVITIES, APPROXIMATELY WHAT PERCENTAGE OF THE TIME WAS SPENT ON EACH OF THE FOLLOWING? (SHOULD APPROXIMATE 100%)

A. ORGANIZATIONAL PLANNING ++++++++++%
B. STAFF PLANNING ++++++++++%
C. DEVELOPING CONTROL PROCEDURES ++++++++++%
D. ADMINISTRATION PLANNING ++++++++++%
E. QUALITY ASSURANCE PLANNING ++++++++++%
F. DEVELOPING AN OVERALL PROJECT MANAGEMENT PLAN ++++++++++%
G. DESIGN STANDARDS (ADDED) ++++++++++%
H. TEST PLANNING (ADDED) ++++++++++%
I. DOCUMENT & CONFIGURATION MGMT. PLANNING (ADDED) ----------%
Y. NONE (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		005	010	033	010	010	010	005	010	025	010	002	016	005	YES		030	040	020		005	005			050		015			000
01 B		010	010	033	030	010	050	010	010	025	005	010	016	001			030	010	010		010	010			050		010			000
01 C		050	030	033	020	030	010	020	010	005	010	020	042	004			005	010	015		015	005					020			020
01 D		005	030		015	010	010	005	010	005	005	015		015			005	005	015		010	005					015			035
01 E		015	010		015	025		015	030	010	020	015	008	025			010	005	010		010						020			015
01 F		010	010		010	015	020	045	030	030	050	005	016	015			020	020	020		015	075					020			030
01 X	MIS															MIS				MIS			MIS	MIS		MIS		MIS	MIS	
01 Z		005										033		035				010	010		035									

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	003		020	010	010	010			010	020	010	010	050	025	050	YES	020	010	005	040	010	005	020	010	020	000	015	010	020	
01 B	005		030	015	020	060	010		010	010	010	010		025	025	YES	010	020	010		030	015	005	030	030	005	045	010	005	
01 C			020	010	020	020	060		020	030	035	020	050		025	YES	020	010	025	040		010	010	010	005	005	015	005	020	020
01 D	020			005	010	010			005	010	010	010				YES	005	020	015			005	010	010	020	000	010	030	020	
01 E	005			010	030		030		025	010	015	020				YES	010		025	020		015	005	015	005	005	005	005	020	030
01 F	002		030	050	010				015	020	020	030		050		YES	035	040			030	040	050	025	020	020	010	040	015	
01 G	020								015																					
01 H	040																				030					010				
01 I	005																					010								
01 X		UNK						CPU																						
01 Z																			020							055			050	

QUESTION 43

THE SYSTEM WAS:
A. DELIVERED TO THE USER AS AN ENTITY
B. DELIVERED TO THE USER IN PHASED INCREMENTS
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			YES		C04	YES	YES			YES	YES			YES		YES	YES		YES	YES	YES	YES					YES	YES	YES	YES
01 B	YES	C03		YES					YES				YES		YES			YES					C05	YES	YES	YES				
01 Z								OTH				OTH																		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A						YES			YES	YES			YES	YES	YES	YES	YES	YES	YES		YES	YES	YES							YES
01 B			YES	YES	YES		YES				YES	YES								YES				YES	YES	YES	YES	YES	YES	
01 X		UNK																												
01 Z	OTH							OTH																						

QUESTION 44 WAS EVERY MAJOR SOFTWARE MODULE DESIGNED IN TOTAL BEFORE ANY CODING WAS STARTED?

A. YES
B. NO (PERCENT OF DESIGN COMPLETED WHEN CODING STARTED**********%)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES					YES													YES	YES					YES	YES					
01 B		050	YES	075	030		YES	085	060	050	YES	YES	070	020	030	090	030				YES	060	YES	090			YES	090	060	050	020
01 Z			OTH													OTH											OTH				

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A							YES		YES	YES									YES			YES	YES							YES
01 B	075		YES	050	090	YES		YES			035	040	090	050	050	010	090	070		080	050			090	080	060	075	065	080	
01 X		UNK																												

QUESTION 45

A QA PROGRAM WAS:
A. APPLIED INFORMALLY
B. APPLIED FORMALLY AND DOCUMENTED SEPARATELY
C. APPLIED FORMALLY AND DOCUMENTED AS PART OF THE PROJECT MANAGEMENT PLAN
Y. NOT APPLICABLE TO (OR USED ON) THIS PROJECT (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES	YES	YES	YES	YES	YES	YES					YES							C01	YES			YES		YES	YES	YES
01 B	YES		YES										YES																	
01 C		YES									YES	YES				YES					YES			YES	YES		YES			
01 X																				MIS										
01 Y														NON			NON	NON	NON											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES			YES			YES		YES			YES		YES						YES	YES			YES	YES		YES
01 B		YES			YES	YES			YES		YES									YES	YES				YES					
01 C			C02						YES					YES				YES								YES			YES		
01 Y													NON			NON					C02										
01 Z																						OTH									

QUESTION 46

IN WHICH OF THE FOLLOWING AREAS WERE FORMAL (AND/OR) DOCUMENTED QA STANDARDS APPLIED AND WERE THESE COMPANY-WIDE STANDARDS OR STANDARDS DEVELOPED SPECIFICALLY FOR THIS PROJECT? (ADDED) (BOEING 1976)

	01 COMPANY-WIDE STANDARDS	02 LOCAL TO PROJECT
A. DOCUMENTATION		
B. WORK BREAKDOWN STRUCTURE (WBS) CODE		
C. SCHEDULING		
D. PERFORMANCE MEASUREMENT		
E. REQUIREMENT ANALYSIS		
F. PRELIMINARY DESIGN		
G. DETAIL DESIGN		
H. CODING		
I. TEST PLANNING		
J. SOFTWARE VERIFICATION		
K. REVIEWS AND AUDITS		
L. CONFIGURATION MANAGEMENT		
M. DISCREPANCY REPORTING AND CORRECTION		
N. SOFTWARE ACCEPTANCE		
Y. NO FORMAL (OR DOCUMENTED) QA STANDARDS (ADDED)		
Z. OTHER		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A						YES				YES			YES											YES						
01 B		YES				YES				YES	YES				YES									YES				YES		
01 C		YES				YES				YES					YES									YES				YES		
01 D												YES												YES						
01 E													YES											YES						
01 F										YES			YES								YES			YES						
01 G						YES				YES			YES								YES			YES						
01 H						YES				YES			YES											YES						
01 I													YES											YES						
01 J													YES								YES			YES						
01 K		YES											YES		YES						YES			YES				YES		
01 L		YES				YES				YES		YES	YES								YES			YES						
01 M										YES			YES											YES						
01 N													YES											YES						
01 X																MIS				MIS								MIS		
01 Y	NON			NON	NON	NON			NON	NON	NON	NON				NON					NON			NON	NON		NON	C04	NON			NON

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A									YES			YES						YES	YES	YES					YES		YES	YES		YES
01 B																		YES	YES			YES	YES					YES		
01 C		YES							YES									YES	YES			YES	YES		YES		YES			
01 D																			YES				YES		YES					
01 E																		YES	YES				YES		YES					
01 F		YES							YES			YES							YES						YES					YES
01 G									YES			YES							YES						YES		YES			YES
01 H																				YES								YES		YES
01 I										YES		YES						YES	YES			YES								
01 J																			YES	YES					YES		YES			
01 K		YES							YES	YES	YES							YES	YES			YES			YES		YES			YES
01 L		YES							YES									YES	YES	YES		YES	YES							
01 M									YES									YES	YES			YES	YES		YES		YES			
01 N																		YES	YES			YES			YES		YES			
01 X			MIS																											
01 Y	C01			NON	NON	NON	NON	C01							NON	NON	NON	NON	NON			NON		NON		NON			C01	

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A	YES	YES	YES	YES					YES		YES	YES			YES				YES		YES			YES	YES		YES	YES		
02 B				YES								YES												YES	YES		YES			
02 C				YES		YES					YES	YES									YES			YES	YES					
02 D		YES		YES		YES									YES		YES													
02 E		YES		YES		YES									YES		YES							YES	YES					
02 F		YES	YES	YES		YES					YES	YES			YES										YES		YES	YES		
02 G		YES	YES	YES							YES	YES			YES										YES		YES	YES		
02 H		YES		YES							YES	YES			YES									YES	YES		YES	YES		
02 I	YES	YES		YES		YES					YES	YES			YES						YES			YES			YES	YES		
02 J		YES	YES	YES		YES			YES		YES	YES			YES		YES							YES	YES		YES	YES		
02 K	YES		YES	YES		YES					YES	YES									YES			YES			YES			
02 L	YES		YES	YES							YES				YES		YES				YES			YES			YES	YES		
02 M	YES	YES	YES	YES		YES			YES		YES	YES			YES		YES				YES			YES	YES			YES		
02 N	YES	YES	YES	YES		YES			YES			YES			YES						YES			YES	YES			YES		
02 X																MIS				MIS									MIS	
02 Y					NON		NON	NON		NON			NON	NON				NON				NON	NON			C04				NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A		YES		YES	YES	YES		YES		YES	YES			YES								YES	YES					YES		
02 B		YES		YES	YES			YES	YES	YES	YES			YES	YES													YES		
02 C				YES	YES			YES		YES	YES			YES	YES					YES						YES		YES	YES	
02 D		YES		YES	YES	YES		YES	YES	YES								YES										YES	YES	YES
02 E		YES		YES	YES	YES		YES	YES	YES	YES				YES													YES		
02 F				YES	YES	YES		YES		YES					YES			YES					YES					YES	YES	
02 G		YES		YES	YES	YES		YES		YES	YES							YES					YES					YES	YES	
02 H		YES		YES	YES	YES		YES	YES	YES	YES							YES	YES				YES				YES		YES	
02 I		YES		YES	YES	YES		YES	YES		YES			YES									YES			YES		YES	YES	YES
02 J		YES		YES	YES	YES		YES	YES	YES	YES				YES			YES					YES			YES		YES	YES	
02 K				YES	YES	YES		YES						YES									YES					YES	YES	
02 L				YES	YES	YES	YES	YES			YES				YES											YES			YES		
02 M		YES		YES	YES	YES	YES	YES			YES				YES											YES		YES	YES	YES	
02 N		YES		YES		YES		YES	YES		YES				YES				YES				YES			YES		YES	YES	YES
02 X			MIS																											
02 Y	C01											NON	NON			NON	NON				NON			NON	NON					

QUESTION 47 WHICH OF THE MODERN PROGRAMMER PRACTICES GIVEN BELOW WERE USED IN THE SOFTWARE DEVELOPMENT PROJECT?

A. PROGRAM MANAGER AUTHORITY--BOTH TECHNICAL AND ADMINISTRATIVE RESPONSIBILITY FOR PROJECT (BLACK 1977)
B. REVIEWS--FORMAL MILESTONE REVIEWS AT EACH PHASE (BLACK 1977)
C. UNIT DEVELOPMENT FOLDERS--CAPTURE OF WORKING MATERIALS FOR EACH IDENTIFIED ITEM TO FACILITATE AND ITEM DEVELOPMENT, TESTING, DOCUMENTATION (INGRASSIA 1976)
D. DESIGN DISCIPLINE AND VERIFICATION--TOP-DOWN DESIGN, FORMAL DESIGN REPRESENTATION, COMPLETION OF DESIGN, AND DELIBERATE VERIFICATION OF DESIGN PRIOR TO CODE (BLACK 1977)
E. PROGRAM MODULARITY--DEFINITIONS/RESTRICTIONS ON DATA INTERFACES BETWEEN MODULES, ADHERENCE TO PARENT/CHILD RELATIONSHIPS BETWEEN MODULES (BLACK 1977)
F. NAMING CONVENTIONS-STRUCTURED NAMES FOR MODULES AND/OR DATA NAMES (BLACK 1977)
G. STRUCTURED FORMS--USE OF DIJKSTRA FORMS AS SUPPORTABLE IN YOURI PROGRAMMING LANGUAGE (1972)
H. STRUCTURED WALKTHOUGHS--DELIBERATE PEER REVIEWS OF CODE FOR EACH MODULE (WEINBERG 1971)
I. STRUCTURED ANALYSIS--A FORMAL DESCRIPTION OF THE USERS REQUIREMENTS (YOURDON 1976)
J. STRUCTURED DESIGN--BUILDING SYSTEM FROM SMALL, HIGHLY INDEPENDENT, SINGLE PURPOSE MODULES (YOURDON 1976)
K. CHIEF PROGRAMMER TEAMS--A DEVELOPMENT ORGANIZATION AROUND A PROGRAMMER OF GREAT ABILITY (BAKER 1972)
L. HIPO--A DOCUMENTATION TECHNIQUE (IBM 1975)
M. SUPPORT LIBRARIES AND FACILITIES--USE OF AUTOMATED OR PROCEDURALIZED DESIGN, CODING AND CONFIG MANAGEMENT ACCEPTANCE TESTING (BLACK 1977)
N. PHASED TESTING--DEFINED AND FORMALIZED UNIT, FUNCTIONAL, AND ACCEPTANCE TESTING (BLACK 1977)
O. CONFIGURATION MGT/CHANGE CONTROL--CREATION AND CONTROL OF BASELINE AND PROCEDURES FOR PROBLEM REPORTING/RESOLUTION (BLACK 1977)
Y. NONE OF THE ABOVE (ADDED)
Z. OTHER

	RESPONDOR																												
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		YES		YES		YES			YES	YES	YES	YES	YES	YES	YES		YES	YES	
01 B	YES	YES	YES		YES	YES		YES			YES		YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		YES
01 C			YES			YES			YES				YES			YES					YES	YES	YES	YES			YES	YES		
01 D	YES	YES		YES		YES		YES			YES	YES	YES			YES						YES		YES	YES			YES		
01 E	YES	YES		YES	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES							YES	YES	YES	YES	YES	YES		YES
01 F	YES	YES			YES			YES	YES			YES	YES		YES	YES						YES	YES	YES	YES		YES	YES		
01 G											YES									YES				YES				YES		

01	H		YES		YES		YES		YES			YES	YES		YES	YES					YES			YES	YES		YES	YES			
01	I				YES					YES					YES										YES						
01	J		YES		YES	YES	YES		YES	YES	YES				YES												YES	YES	YES		
01	K		YES					YES	YES	YES	YES		YES		YES	YES							YES		YES	YES	YES		YES		
01	L				YES																				YES	YES					YES
01	M	YES	YES	YES		YES							YES	YES			YES				YES	YES			YES		YES		YES		
01	N	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES			YES	YES			YES	YES	YES	YES	YES	YES		YES	YES		YES
01	O	YES	YES	YES			YES		YES	YES		YES	YES	YES		YES	YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES		
01	Y														C03																

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES	YES	YES		YES	YES		YES		YES	YES	YES	YES		YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 B	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 C				YES																		YES					YES				
01 D		YES						YES	YES			YES					YES	YES				YES	YES			YES	YES		YES		
01 E	YES	YES	YES	YES		YES		YES	YES		YES				YES				YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		
01 F	YES		YES	YES	YES			YES	YES		YES		YES		YES	YES	YES		YES	YES		YES	YES				YES		YES	YES	
01 G		YES		YES							YES									YES			YES								
01 H		YES				YES		YES	YES									YES	YES			YES					YES	YES			
01 I		YES						YES	YES		YES																YES		YES	YES	
01 J		YES	YES	YES		YES		YES	YES	YES	YES	YES										YES	YES			YES	YES	YES	YES	YES	
01 K	YES	YES				YES		YES								YES			YES			YES				YES	YES			YES	
01 L		YES									YES											YES				YES	YES			YES	
01 M	YES	YES	YES			YES	YES		YES		YES								YES	YES		YES		YES				YES		
01 N		YES		YES	YES	YES	YES	YES	YES		YES			YES	YES			YES				YES		YES	YES	YES	YES	YES	YES	
01 O	YES	YES	YES		YES	YES	YES	YES	YES		YES			YES	YES		YES	YES	YES	YES		YES	YES	YES	YES	YES	YES		YES		

QUESTION 48

WHICH OF THE BELOW LISTED DOCUMENTATION TYPES WERE USED IN THE PROJECT IF A SINGLE DOCUMENT COVERED MORE THAN ONE AREA, CHECK EACH AREA ACCOUNTED FOR. THE INTENT OF THIS QUESTION IS TO DETERMINE WHICH AREAS WERE COVERED BY DOCUMENTATION NOT THE ACTUAL DOCUMENT FORM. (SEE SECTION 2 FOR DEFINITIONS)

A. FUNCTIONAL DESCRIPTION
B. DATA REQUIREMENTS DOCUMENT
C. SYSTEM/SUBSYSTEM SPECIFICATION
D. PROGRAM SPECIFICATIONS
E. DATA BASE SPECIFICATIONS
F. USERS MANUAL
G. COMPUTER OPERATIONS MANUAL
H. PROGRAM MAINTENANCE MANUAL
I. TEST ANALYST REPORT
J. TEST PLANS (ADDED)
K. INTERFACE CONTROL (ADDED)
L. TRAINING COURSE (ADDED)
M. VERSION DESCRIPTION (ADDED)
N. SOFTWARE DEVELOPMENT PLAN (ADDED)
Y. NONE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			C01	YES	YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES		
01 B	YES	YES		YES	YES	YES		YES	YES				YES	C01	YES	YES				YES		YES		YES	YES			YES		
01 C	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES	YES	C01		YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 D	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES			YES	YES	YES	YES	YES	YES	YES		YES	YES	YES
01 E	YES	YES		YES		YES	YES	YES	YES		YES	YES	YES				YES			YES	YES	YES	YES	YES	YES			YES		
01 F	YES	YES	YES	YES	YES	YES		YES	YES		YES		YES	C01	YES	YES	YES	YES		YES	YES		YES	YES	YES			YES	YES	YES
01 G	YES	YES		YES	YES	YES			YES							YES	YES	YES	YES			YES	YES					YES	YES	YES
01 H	C04	YES		YES	YES	YES									YES							YES	YES					YES	YES	YES
01 I	YES	YES		YES	YES						YES	YES	YES			YES				YES	YES	YES	YES	YES	YES		YES	YES	YES	
01 J	C02											C02		C01						C02										C02
01 K																				C02										
01 L																				C02										
01 N																														C02
01 Z																				OTH								OTH		OTH

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES	YES
01 B		YES		YES		YES				YES		YES			YES						YES					YES	YES	YES	YES	YES
01 C	YES	YES		YES		YES	YES	YES			YES	YES	YES		YES			YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES
01 D	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES			YES	YES		YES		YES	YES	YES			YES	YES	YES	YES	YES	YES	YES
01 E		YES		YES		YES		YES			YES		YES	YES			YES		YES		YES			YES	YES	YES	YES		YES	YES
01 F	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES			YES		YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES
01 G	YES	YES	YES	YES		YES		YES		YES							YES	YES		YES				YES			YES	YES	YES	YES
01 H	YES	YES	YES	YES	YES	YES		YES																YES		YES	YES	YES		YES
01 I		YES	YES	YES		YES		YES	YES		YES			YES	YES		YES	YES	YES					YES			YES	YES		YES
01 J	CO2													CO2	CO2									CO2		CO2				CO2
01 L	CO2																													
01 M	CO2							CO2																						
01 N	CO2	YES						CO2																						
01 Z																OTH							OTH							

QUESTION 49 WHICH SOFTWARE TOOLS/AIDS WERE SELECTED FOR USE ON THIS PROJECT?

A. STRUCTURED PRE-COMPILERS
B. AUTOMATIC FLOWCHARTERS
C. LIBRARY MONITORS
D. MACRO PROGRAMMING CAPABILITIES
E. ON-LINE CAPABILITIES
F. ON-LINE DEBUGGING
G. AUTOMATIC TEST CASE GENERATORS
H. SIMULATORS OR DRIVERS (ADDED)
I. BATCH DEBUGGING AIDS (ADDED)
J. STANDARDS AUDITORS (ADDED)
Y. NO SOFTWARE TOOLS/AIDS EMPLOYED
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A											YES										YES					YES				
01 B	YES		YES										YES		C03					YES			YES	YES		YES		YES		
01 C	YES	YES	YES					YES			YES		YES		YES	YES	YES							YES		YES	YES			
01 D		YES	YES		YES			YES	YES	YES	YES				YES	YES					YES		YES	YES	YES		YES			
01 E	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES		YES			YES					YES					YES	YES			
01 F	YES	YES		YES	YES	C02	YES		YES	YES	YES	YES					YES				YES		YES		YES					YES
01 G													YES			YES								YES					YES	
01 H						YES						C02																		
01 I															C02					C02									C02	
01 J																								C02						
01 Y														NON				NON	NON											
01 Z															OTH	OTH				OTH		OTH		OTH						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES						YES												YES				YES		YES			YES	
01 B			YES		YES							YES							YES	YES					YES					
01 C	YES																			YES							YES			
01 D	YES	YES				YES	YES				YES								YES					YES	YES	YES	YES	YES		
01 E		YES	YES	YES		YES	YES	YES						YES	YES	YES		YES	YES		YES	YES		YES		YES	YES	YES		YES
01 F				YES	YES	YES	YES	YES			YES		YES	YES	YES	YES	YES	YES	YES	YES	YES			YES		YES	YES	YES		YES
01 G			YES	YES							YES				YES		YES	YES												
01 H									CO3						CO2															
01 I																CO2														
01 Y										NON													NON							
01 Z			OTH																											

QUESTION 50 WHICH TEST TOOLS/TECHNIQUES/METHODS WERE SELECTED FOR USE ON THIS PROJECT? (HANTWICK, 1977)

A. COMPARATORS--USED TO COMPARE THE CODE OF ONE PROGRAM VERSION TO THAT OF ANOTHER FOR CODING ERRORS
B. EDITORS--ANALYZE SOURCE CODE
C. FLOWCHARTING--SHOW THE LOGIC STRUCTURE OF A PROGRAM
D. LOGIC/EQUATION GENERATORS--TRANSLATES ASSEMBLY LANGUAGE PROGRAMS INTO A MACHINE-INDEPENDENT MICROPROGRAMMING LANGUAGE AND BUILDS THE MICROPROGRAMMING STATEMENTS INTO NETWORKS TO ANALYZE THE FLOW OF CONTROL AND RECONSTRUCT ARITHMETIC STATEMENTS
E. PROGRAM STRUCTURE ANALYZERS--ANALYZE PROGRAM PATHS UNDER INPUT CONTROL:
F. CORRECTNESS PROOFS-ESTABLISHES THAT A GIVEN PROGRAM PERFORMS A DESIRED FUNCTION AND HALTS
G. SYMBOLIC PROGRAM EXECUTIONS--DECOMPOSE SOURCE CODE BY LOGICALLY EXECUTING IT
H. INITIALIZATION TESTS--THE PERFORMANCE OF ALL INITIALIZATION OPERATIONS IS TESTED TO ASSURE THAT ALL INDICATED INITIALIZATION OPERATIONS ARE PERFORMED AND THAT CORRECT VALUES FOR ALL INITIALIZED QUANTITIES RESULT
I. INTERACTION TEST--ALL QUANTITIES, VARIABLES, AND SYSTEM CONDITIONS OBTAINED FROM OTHER MODULES ARE EXAMINED TO DETERMINE THE SENSITIVITY OF THE MODULE UNDER TEST TO THEIR POSSIBLE VALUES OR STATES
J. ARITHMETIC TEST--THE PRECISION OF ARITHMETIC CALCULATIONS IS CHECKED TO DISCOVER WHERE INSUFFICIENT PRECISION IS ATTAINED OR INCORRECT ARITHMETIC CALCULATIONS ARE PERFORMED
K. TIMING ANALYSIS--THE LONGEST AND SHORTEST POSSIBLE EXECUTION TIMES FOR ALL TESTS ARE DETERMINED TO ESTABLISH THE EXECUTION TIME REQUIREMENTS FOR THE MODULE AND TO IDENTIFY POTENTIAL TIMING PROBLEMS
L. BRANCH LOGIC TEST--THE CORRECT BRANCHING DECISION PATHS FOR EACH BRANCH AND EACH CLOSED-LOOP TEST CASE ARE CHECKED. THE BRANCH DECISION PATHS THAT ARE NOT EXERCISED IN ANY OF THE NORMAL TEST CASES ARE IDENTIFIED AND THEIR CORRECTNESS DEMONSTRATED BY SPECIAL TEST CASES
M. COMPARISON OF SYSTEM OUTPUT WITH MANUAL OUTPUT THE SYSTEM WILL REPLACE (ADDED)
N. REAL WORLD SIMULATION (ADDED)
Y. NONE (ADDED)
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES												YES			YES				YES				YES						
01 B		YES			YES				YES				YES			YES				YES	YES			YES			YES			
01 C	YES		YES		YES	YES	YES	YES		YES	YES				YES	YES				YES			YES	YES			YES	YES		YES

01	D													YES																	
01	E																YES				YES		YES	YES	YES						
01	F							YES	YES																						
01	G				YES												YES				YES				YES						
01	H	YES			YES	YES		YES	YES		YES		YES					YES			YES				YES				YES		
01	I	YES				YES		YES	YES		YES						YES	YES			YES								YES		
01	J	YES	YES	YES		YES	YES		YES		YES		YES		YES		YES	YES		YES	YES				YES	YES			YES		
01	K	YES	YES	YES		YES	YES								YES		YES	YES	YES			YES	YES			YES	YES			YES		
01	L	YES		YES		YES	YES		YES		YES	YES	YES		YES			YES			YES			YES	YES	YES	YES			YES		
01	M							C02																							
01	Y				C02											C02				C02								C03			C02	
01	Z												OTH																			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01	A					YES						YES				YES	YES				YES										
01	B						YES				YES		YES		YES	YES	YES				YES	YES						YES			YES	
01	C			YES	YES	YES	YES				YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES				YES			YES	YES	YES	
01	E											YES																			
01	F												YES																		
01	H						YES	YES				YES							YES		YES			YES	YES						
01	I				YES		YES	YES				YES		YES					YES		YES			YES	YES						
01	J						YES		YES	YES	YES	YES		YES		YES	YES	YES	YES					YES	YES	YES					YES	
01	K						YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES				YES	YES			YES			
01	L				YES		YES		YES	YES		YES				YES		YES						YES							
01	N									C02						C02												C02			
01	Y	C02	UNK																												

QUESTION 51 IF YOU HAD TOTAL CONTROL OF THE PLANNING FUNCTION WITHIN YOUR ORGANIZATION, OR WERE ABLE TO INITIATE RESEARCH INTO HOW TO IMPROVE THE PLANNING FUNCTION, WHAT ACTIONS WOULD YOU TAKE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	PRE	MIS	PRD	MIS	P3D	CIA	P8B	MIS	P4C	MIS	MIS	XRA	P3A	MIS	P3A	MIS	PRD	P5G	P8B	MIS	03H	MIS	MIS	P1Y	P3F	MIS	P8B	MIS	S1A	X7A
01 002							P4E					XRE	P1D		P8E														06G	
01 003							P4D					01H			P8F															
01 004							P1E																							
01 005							P1G																							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	MIS	P8C	06A	MIS	MIS	N/A	PRD	X9P	MIS	P5B	P1A	R1J	X7B	S2B	P5H	S1C	D2C	02A	MIS	P1C	C5G	S1C	X9F	MIS	P1D	MIS	P8B	PRD	X4A
01 002			P1D					PRA			P9B	X1B	X1F	X7D	P8J						PRA	CSC	D5C				X9D		
01 003												CVB	X1D															CWC		
01 004												CTC																		
01 005												X1E																		

QUESTION 52 IF IT WERE IN YOUR POWER TO MAKE CHANGES IN THE WAY TECHNICAL DECISIONS ARE MADE CONCERNING PROGRAMMING TECHNIQUES, TEST PROCEDURES, DOCUMENTATION STANDARDS, ETC., WHAT ACTION WOULD YOU TAKE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	X9B	MIS	X9A	MIS	CSI	X7C	XRB	MIS	XRB	MIS	MIS	X9E	MIS	MIS	P8E	04D	XRB	01H	07E	XRB	X7C	MIS	MIS	MIS	P1C	MIS	X9D	MIS	C1B	MIS
01 002			P1H						XRD						P8G										P1F		CWB			
01 003															XRA										P9A					

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	MIS	X9C	CSA	MIS	MIS	X7C	C1A	X9N	MIS	X9K	S5A	X9L	X9M	01A	P5H	NON	X7C	02B	MIS	X7B	CSD	XRC	D3A	MIS	CSE	MIS	X1A	MIS	CVB
01 002				CSC			X9D	CSH			R3B	05C			01B			06E			X7C			D3B		CSB		P9C		CWC
01 003								C1B				S5C														CSA		P9D		CMB
01 004												S5D														CSC		C1A		
01 005												P5F																		

QUESTION 53 TO WHICH ORGANIZATION WITHIN THE FIRM WAS THIS SOFTWARE DEVELOPMENT PROJECT FIRST ASSIGNED:

A. A LINE ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
B. A LINE ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED)
C. A STAFF ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
D. A STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	C03	YES	YES		YES		YES	YES			YES		YES								YES	YES		YES	YES		YES	YES	YES	
01 B						YES				YES		YES							C03	C01	YES		C03	YES					YES	
01 C				C03														YES												C04
01 D									YES													YES								

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES		C03		C04	YES		YES	YES						YES	YES			C03			YES		YES	YES		YES
01 B		YES			YES		C03			YES			YES	YES	YES	YES	YES			C03	YES			YES		C03			YES	
01 C																						YES								
01 D			C03																											

QUESTION 54 WHICH ORGANIZATION WAS RESPONSIBLE FOR DETERMINING THE INITIAL BUDGET, DELIVERY SCHEDULE, RESOURCE REQUIREMENTS, COMPUTER AVAILABILITY, ETC., (FOR SOFTWARE)? (ADDED)

A. THE ORGANIZATION TO WHICH THE PROJECT WAS INITIALLY ASSIGNED
B. A LINE ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
C. A LINE ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED)
D. A STAFF ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
E. A STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED)
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	C03	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	C01	YES		YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	C04
01 E																		C03								YES				

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	C03	YES		YES	YES	C04	YES				YES	YES	YES	YES	YES		YES	C03	YES	C04		YES	YES	YES	C04	YES	YES	YES
01 B										YES	YES																			
01 C																		YES												
01 D																							YES							
01 E					YES							YES																		

QUESTION 55

WHEN THIS PROJECT WAS INITIALLY ASSIGNED:

A. THE ULTIMATE PROJECT MANAGER PARTICIPATES IN DETERMINING THE SCHEDULE, BUDGET FIGURES, ETC.

B. THE PLANNING, BUDGETING, AND ALLOCATION OF RESOURCES WAS DONE BY A SPECIAL STAFF ESTABLISHED FOR THIS FUNCTION. (GIVE NAME)

C. AN AD HOC GROUP WAS SET UP TO HANDLE THE INITIAL ASSIGNMENT UNTIL A PERMANENT GROUP WAS ESTABLISHED

Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES		YES	YES	YES	YES	
01 B																YES									ACB	YES				
01 C																					YES									YES

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES		C01	YES	C03	YES	YES	YES	YES		YES	YES	YES
01 B			C03		C03														YES										C03	
01 C												YES										YES					YES			

QUESTION 56 TO WHICH ORGANIZATION WAS THE (SOFTWARE) PROJECT ASSIGNED FOR DEVELOPMENT? (ADDED)

A. THE ORGANIZATION TO WHICH THE PROJECT WAS INITIALLY ASSIGNED
B. THE ORGANIZATION RESPONSIBLE FOR DETERMINING INITIAL BUDGET, SCHEDULE, ETC.
C. A LINE ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
D. A LINE ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED)
E. A STAFF ORGANIZATION UNDER THE AUTHORITY OF THE SENIOR ADP MANAGER
F. A STAFF ORGANIZATION OUTSIDE THE AUTHORITY OF THE SENIOR ADP MANAGER (OR NO SENIOR ADP MANAGER) (ADDED);
Z. OTHER;

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 B																		YES												
01 C			YES																	YES										
01 D										YES																				

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES		YES	YES		YES	YES	C04	YES	YES	YES		YES	YES	YES	YES	YES			C03		C04	YES		YES		YES	YES	YES	YES
01 B												YES																		
01 C																			YES											
01 D					YES													YES			YES			YES		C01;				
01 X		MIS																												

QUESTION 57

THE SOFTWARE DEVELOPMENT WAS ORGANIZED UNDER (THE FOLLOWING PROJECT TYPES) (ADDED)
A. A PROJECT ORGANIZATION
B. A MATRIX ORGANIZATION
C. A PROJECT MANAGER WITH ADMINISTRATIVE AUTHORITY WHILE THE ACTUAL DEVELOPMENT WORK WAS DONE BY LINE AND STAFF ORGANIZATIONS
Y. NOT ORGANIZED UNDER A PROJECT (TYPE) ORGANIZATION (ADDED)
Z. OTHER:

	RESPONDOR																										
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES		YES		YES						YES	YES			YES				YES	YES		YES	YES				YES	YES
01 B							YES	YES	YES	YES	YES	YES			YES	YES		YES	YES	YES			YES	YES		YES		YES		
01 C																											YES			
01 Y				NON		NON																								

	RESPONDOR																										
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES		YES	YES	YES	YES		YES						YES			YES								YES	YES	L03
01 B		YES	YES		YES			YES		YES			YES	YES	YES	YES		YES	YES		YES	YES	YES	YES	YES	YES	YES			
01 C			YES									YES						YES												

QUESTION 58

IN THIS PROJECT:

A. SOFTWARE DEVELOPMENT WAS HANDLED WITHIN THE ADP ENVIRONMENT WITH FUNCTIONAL ANALYSTS OR PROSPECTIVE USERS BEING ASSIGNED OR ATTACHED TO THE DEVELOPMENT TEAM
B. ADP SPECIALISTS WERE DETAILED OR ASSIGNED TO THE FUNCTIONAL USER FOR THE DURATION OF THE DEVELOPMENT EFFORT
C. THE FUNCTIONAL USER EMPLOYED "ANALYSTS" WHO DEVELOPED SPECS., DESIGNS, ALGORITHMS, ETC., WHICH WERE THEN PRESENTED TO THE SOFTWARE DEVELOPMENT TEAM FOR IMPLEMENTATION
D. THE ADP FUNCTION WAS DONE BY THE FUNCTIONAL ANALYST/USER (I.E. ADP WAS NOT A SEPARATE FUNCTION) (ADDED)
E. THE FUNCTIONAL ANALYSIS WAS DONE BY THE ADP PERSONNEL (I.E. THERE WAS NOT A SEPARATE USER ANALYSIS) (ADDED)
Y. NONE OF THE ABOVE (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			YES		YES	YES	YES	YES		YES	YES	YES	YES				YES		YES			YES		YES	YES		YES		YES	YES
01 B									YES							YES					YES									
01 C	C03	YES		C04										YES				YES								YES		YES		
01 E															C04					C03			C03							

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES		YES						YES					YES				YES	YES	YES		YES		YES		YES	
01 B		YES						YES	YES		YES															YES				
01 C		YES			YES				YES		YES			YES	YES	YES	YES		YES	YES				YES						
01 D			C03																	C02										
01 E																												C02		C02
01 Y	C02																													

QUESTION 59 HOW MANY POSITIONS (FILLED & UNFILLED) SUPPORTED THE PROJECT? (ADDED)

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	CFU	034	CFU	019	015	030	010	MIS	015	020	017	012	020	025	MIS	MIS	040	003	002	100	008	066	130	275	004	MIS	015	CFU	100	006

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	025	MIS	011	040	010	060	011	080	024	010	CFU	MIS	015	003	020	MIS	020	010	010	010	005	MIS	008	030	MIS	030	MIS	032	050	100

QUESTION 60 WAS THE (SOFTWARE) PROJECT ORGANIZATION DIVIDED INTO TEAMS EACH HEADED BY A TECHNICAL LEADER? NOTE: IN A SMALL PROJECT ORGANIZATION WITH DIVERSE ACTIVITIES IT WOULD BE POSSIBLE TO HAVE ONE-PERSON TEAMS (ADDE

A. YES
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 B							YES																							
01 X																										MIS				

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	C03	YES		YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES
01 B					YES					YES																				

QUESTION 61 WHICH TYPES OF TEAMS WERE EMPLOYED IN SOFTWARE DEVELOPMENT (FOR THE PURPOSE OF THIS QUESTION AN ENGINEER IS CONSIDERED AN ANALYST) (ADDED)

A. COMBINED (FUNCTIONAL) ANALYSIS-PROGRAMMER TEAM (ADDED)
B. SEPARATE SOFTWARE (APPLICATION) ANALYSIS TEAM (ADDED)
C. SEPARATE PROGRAMMER TEAM
D. SEPARATE TEST TEAM
E. SEPARATE INTEGRATION TEAM
F. SEPARATE INTERFACE TEAM
G. SEPARATE PRODUCT ACCEPTANCE TEAM (ADDED)
Y. DID NOT EMPLOY TEAMS
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	C03	YES			YES	YES	YES	YES
01 B												YES								YES			YES	YES				YES		
01 C	YES																		YES				YES					YES		
01 D	YES			YES							YES					YES	YES			YES	YES	YES	YES	YES				YES		
01 E	YES										YES					YES	YES					YES	YES	YES	YES			YES		
01 F																	YES							YES				YES		
01 G																							C02							
01 X							MIS																			MIS				
01 Z																				OTH			OTH						OTH	

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES	C03	YES		YES	YES	YES			YES					YES		YES		YES	YES	YES	C03	YES		YES	YES	YES		YES
01 B			C03						YES						YES	YES	YES		YES										YES	
01 C												YES	YES	YES	YES	YES			YES						YES				YES	
01 D				YES		YES		YES	YES				YES	YES	YES	YES	YES	YES							YES				C03	
01 E				YES		YES		YES	YES			YES				YES	YES	YES	YES						YES	YES			YES	
01 F								YES				YES				YES									YES					
01 G																C02														
01 Y					NON					NON																			NON	
01 Z																											OTH			

QUESTION 62

WHICH OF THE FOLLOWING FUNCTIONS WERE INTERNAL TO THE PROJECT MANAGEMENT ORGANIZATION?

A. ADMINISTRATION
B. PROJECT CONTROL
C. PROGRAM SUPPORT LIBRARIAN
D. PRODUCT/QUALITY ASSURANCE (ADDED)
E. CONFIGURATION MANAGEMENT (ADDED)
Y. NO FUNCTIONS OF THIS TYPE WERE INTEGRAL IN THE PROJECT MANAGEMENT ORGANIZATION
Z. OTHERS

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES		YES	YES	YES	YES	YES		YES	YES		YES	YES			YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 B	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES		YES	YES			YES		YES	YES	YES	YES	YES	YES			YES	YES	YES
01 C	YES	YES	YES	YES	YES					YES	YES						YES			YES	YES		YES				YES		YES	
01 D																							C02							
01 E																							C02							
01 X																MIS										MIS:				
01 Y													NON						NON											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES	YES		YES		YES	YES	YES				YES	YES		YES	YES	YES	YES	YES	YES	YES	YES		YES		YES	YES
01 B	YES	YES		YES		YES	YES		YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 C	YES	YES				YES	YES		YES	YES	YES		YES	YES	YES	YES	YES	YES		YES		YES	YES			YES	YES			
01 D	C02														C02															
01 E	C02														C02															
01 Y			C03					NON				NON			NON															

QUESTION 63 TO WHOM DID THE TEST TEAM REPORT?
A. THE PROJECT MANAGER
B. OTHER THAN PROJECT MANAGER (ADDED)
Y. DID NOT EMPLOY A (SEPARATE) TEST TEAM (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES		YES			YES	YES	YES		YES		YES		YES	YES		C03	YES	YES	YES	YES	YES				YES	
01 B					C02											C02												C02		
01 X																										MIS				
01 Y		NON	NON				NON	NON				NON		NON					NON								NON			NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES	YES		YES	YES	YES	YES		YES		YES		YES	YES	YES	YES		YES		YES	YES		YES		YES	C02	YES	YES
01 B					C02									C02										C02						
01 Y	C01									NON		NON							NON		NON					NON				

QUESTION 64 HOW MANY INDIVIDUAL TEAMS WERE ASSIGNED TO THE PROJECT?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	005	003	004	004	004	006	N/A	003	003	003	003	002	MIS	004	003	EFU	004	003	004	004	004	004	007	045	001	MIS	001	001	006	004

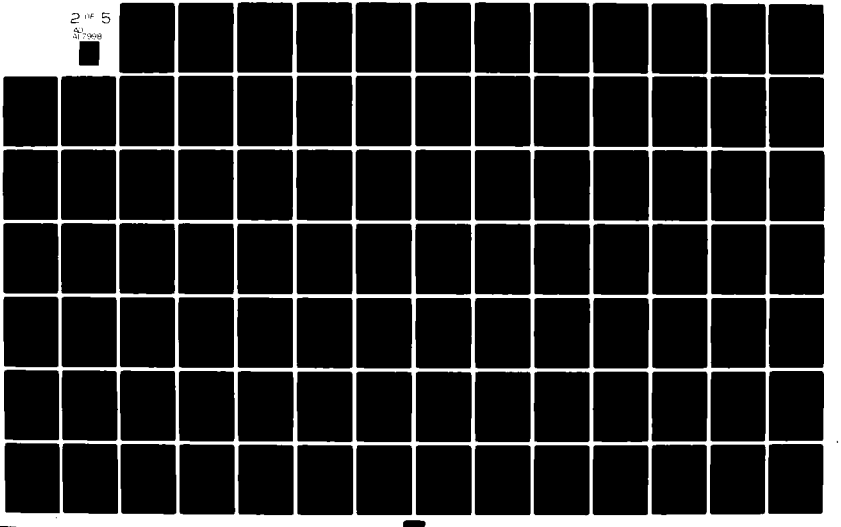
PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	004	016	001	007	002	003	003	004	007	N/A	UNK	003	002	003	004	VAR	004	005	010	003	002	VAR	003	001	003	005	004	003	010	005

QUESTION 65 THE TEAMS WERE ORGANIZED UNDER
A. A CHIEF PROGRAMMER (BAKER 1972)
B. A LEAD PROGRAMMER (A SENIOR EXPERIENCED PROGRAMMER)
C. TASK LEADER/WORK LEADER/PROJECT LEADER (ADDED)
D. LEAD ENGINEER/SYSTEMS ENGINEER/ANALYST (ADDED)
Y. DID NOT USE TEAMS
Z. OTHERS

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES			YES																						
01 B	YES	YES	YES	YES		YES			YES	YES	YES	YES		YES	YES						YES			YES	YES		YES	YES		YES
01 C																				C02		C02	C02						C02	
01 D	C02																C02													
01 X																MIS										MIS				
01 Y							NON						NON																	
01 Z																		OTH	OTH											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES													YES							YES								
01 B				YES		YES	YES					YES					YES	YES	YES	YES	YES		YES	YES	YES		YES	YES	YES	YES
01 C	C02		C02		C02			C02	C02				C02	C02		C02														
01 D											C02															C02				
01 Y										NON																				

AD-A117 998 SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/G 22/2
RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U)
DEC 79 R H THAYER, J H LEHMAN
UNCLASSIFIED SM-ALC/MME-TR-79-54-VOL-2 NL



QUESTION 66

WERE ANY OF THE POSITIONS IN THE DEVELOPMENT ORGANIZATION REFERRED TO BY THE FOLLOWING TITLES? (TITLES TAKEN FROM YOURDON, HOW TO MANAGE STRUCTURED PROGRAMMING, 1976, AND BROOKS MYTHICAL MAN-MONTH, 1975)

A. CHIEF PROGRAMMER
B. BACK-UP PROGRAMMER
C. PROGRAM SUPPORT LIBRARIAN
D. SURGEON
E. ADMINISTRATOR
F. EDITOR
G. CO-PILOT
H. PROGRAMMING CLERK
I. TOOL SMITH
J. TESTER
K. LANGUAGE LAWYER
L. SOFTWARE ARCHITECT
M. SOFTWARE ENGINEER (ADDED)
N. TECHINAL DIRECTOR (ADDED)
Y. NONE OF THE ABOVE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES																							YES					
01 B				YES																					YES					
01 C				YES							YES		YES								YES									
01 E		YES		YES																					YES					
01 F		YES																												
01 J													YES				YES					YES		YES	YES					
01 L																	YES				YES		YES	YES	YES					
01 M	C02											C02																		
01 X														MIS												MIS				
01 Y			NON		NON	NON	NON	NON	NON	NON						NON	NON		NON	NON	NON						NON	NON	NON	NON

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES	YES														YES			YES					YES			
01 B	YES	YES														YES											YES			
01 C	YES	YES																		YES		YES					YES		YES	
01 E																											YES		YES	
01 F																	YES													
01 H			YES										YES	YES													YES			
01 J				YES											YES		YES												YES	
01 L				YES							YES																		YES	
01 N				YES		YES																								
01 Y							NON	NON	NON	NON		NON						NON			NON		NON	NON	NON	NON		NON		NON

QUESTION 67 WHICH OF THE MANY FORMS OF PROJECT ORGANIZATION DO YOU FEEL CONTRIBUTES THE MOST TO THE SUCCESS OF THE PROJECT?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	05I	05J	05G	05G	MIS	MIS	MIS	05H	MIS	05H	05H	06I	MIS	MIS	05B	05I	UNK	05G	05H	05H	05H	MIS	MIS	01E	MIS	05J	MIS	05F	D/K
01 002		05J	05K						05J		07G		CTC			05C				05C							05M			
01 003																	07B			05D							06E			
01 004																	07C													
01 005																	07D													

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	05I	MIS	05E	05F	06E	MIS	05G	05G	MIS	MIS	MIS	MIS	05G	05Y	05Y	05H	MIS	05L	05H	MIS	05G	05B	05G	MIS	MIS	05F	05E	05D	05I	N/A
01 002	06E														06F								06C					06C	05J	
01 003															06B														09A	
01 004															06I															

QUESTION 68 IF YOU HAD IT WITHIN YOUR POWER TO MAKE ONE CHANGE IN THE WAY THE PROJECT WAS ORGANIZED, WHAT ACTION WOULD YOU TAKE, OR IF YOU HAD THE RESOURCES AVAILABLE TO UNDERTAKE RESEARCH IN ANY AREA OF PROJECT ORGANIZATION, WHICH ASPECT WOULD YOU EXPLORE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	01F	MIS	PSC	05G	MIS	MIS	MIS	05H	MIS	05N	MIS	MIS	MIS	MIS	C1D	P1C	P1C	MIS	31F	MIS	MIS	MIS	MIS	MIS	MIS	MIS	05F	S5A
01 002										06C		05M																		X91
01 003										07G																				
01 004										07H																				
01 005										07F																				

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	NON	D5B	MIS	NON	MIS	MIS	N/A	PRD	MIS	MIS	MIS	MIS	03E	06H	P8E	03A	NON	02D	MIS	MIS	S1I	03G	06E	MIS	MIS	ONA	MIS	061	CRB	S2E
01 002															R1A	03B										ORB		06J	CRE	
01 003															R1B														CRD	

QUESTION 69 WHAT WAS THE SOURCE OF THE PROJECT MANAGER?

A. NEW HIRE FROM ANOTHER COMPANY
B. NEW HIRE FROM SCHOOL
C. TRANSFER FROM ANOTHER PROJECT
D. TRANSFER FROM WITHIN COMPANY OTHER THAN PROJECT
E. PROMOTED FROM WITHIN PROJECT (ADDED)
F. THE PROJECT MANAGER WAS APPOINTED OR SELECTED FOR THIS PROJECT BY
Y. DID NOT HAVE A PROJECT MANAGER (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																					YES								YES	
01 C				YES	YES		C03	YES			YES	YES		YES	YES			YES	YES	C03		C03				YES	YES			
01 D	YES	YES	YES			YES			YES	YES			YES			YES	YES						YES	YES	YES	YES		YES		YES
01 F	MPD	VPG	VPG	MCP	MEN	MEN	OTH	MGR	MPA	MCP	MCP	PEN	VPE	OCU	MGR	MGR	MPD	MGR	MPD	MEN	MGR	MCP	MPD	VPG	MCP	MIS	MEN	MGR	VPG	PMS

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES														YES									YES			
01 B																		YES												
01 C		YES	YES		YES	YES	YES		YES	C03		YES		YES		C03	YES	YES	YES			YES	YES							
01 D	YES							C03			YES		YES								YES				YES	YES	YES		YES		C03
01 E															C02															
01 F	MGR	MPD	MPD	VPG	MEN	MGR	MEN	PMW	MPD	MGR	MIS	MGR	PEN	PEN	MGR	PMR	MIS	MCP	MCP	MIS	VPG	MCP	MCP	FEN	UNK	MEN	MPA	MEN	MEN	MCP
01 Z																					OTH								OTH	

QUESTION 70 HOW MANY YEARS EXPERIENCE DID THE PROJECT MANAGER HAVE IN THE FOLLOWING AREAS?

A. FUNCTIONAL AREA OF PROJECT ********YRS
B. DATA PROCESSING ********YRS
Y. NO EXPERIENCE (NO PROJECT MANAGER) (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	015	010	005	003	008	010	004	005	007	012	010	016	005	010	001	020	000	005	010		000	YES	007	005	025	010	006	012	008	000
01 B	015	015	010	003	013	005	020	012	005	006	012	018	010	000	006	015	012	010	002		005	YES	020	015	025	019	003	000	008	015
01 Z																				DTH										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	015	010		002	002	002	020	004	013	004	010		002	005	015	015	002	010	005	007	005	011	000	009	000	005	002	005	005	004
01 B	020	010		019	005	004	020	026	002	001	006		006	005	015	012	010	010	007	000	014	000	008	014	022	008	010	005	017	015
01 Y			NON									NON																		

QUESTION 71

HOW MANY YEARS OF PRIOR EXPERIENCE DID THE PROJECT MANAGER HAVE IN THE FOLLOWING AREAS AND CAPACITIES?

CAPACITY 01 02 03 04

AREA

A. COMMERCIAL/BUSINESS
B. SCIENTIFIC
C. SIMULATION
D. PROCESS CONTROL (TO INCLUDE EMBEDDED COMPUTER SYSTEMS)
E. COMMAND AND CONTROL
F. MGT INFORMATION SYSTEM
G. SYSTEM SOFTWARE
H. REAL TIME APPLICATIONS
I. DATA COMMUNICATIONS
J. COMPUTER OPERATIONS
Y. NO EXPERIENCE/NO PROJECT MANAGER (ADDED)
Z. OTHER

01 = FUNCTIONAL AREA IN YEARS
02 = ANALYST/PROGRAMMER IN YEARS
03 = TEAM CHIEF IN YEARS
04 = PROJECT MANAGER IN YEARS

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					001	002		005																			000	012			
01 B	009					010			002	008	005		005						010				007		025		004				
01 C	002		001			002			002	004		008		005													006				
01 D			003			008			003				002		002												006				
01 I	014	010	005			010				005	005		004	010						005									008		
01 F					001																									
01 G					006				003		003		002		002												005				
01 H	009	010	003		001				002	004	008	010	005	010	002												011		008		
01 I					001																									
01 J					003																									
01 X				MIS				MIS								MIS								MIS						
01 Y																	C02	C02		C02	C02				C01				C02	
01 Z											003																			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					004									000				002							002		002			004
01 B	020				002				001					007			010	005	007		005				008			005	005	
01 C	010								001					000			002	005										005		
01 D					002	004	020							000				005	005									005		
01 E	020				002		020			004				007	015		010	005										005	008	
01 F					002									000				001							005				004	004
01 G	015				002	002								005	005			005	003						010			005		
01 H	020				002	004	010						002	005			008	005	005						004			005		
01 I	010			005		004								000				001										005		
01 J					006	004								007				002										005		
01 X		MIS	UNK																											
01 Y								C02			C02	C02				C02				C02		C02	C02	C02		C01				

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A					008																									
02 B	005				006			007	001	006	002		003		006			005	002				015		015		004			015
02 C	002		002						002	002			004		002			005		002		YES				005	006			
02 D									001						002		001									002				
02 E		007	002							003	005		004				001					YES				005			002	
02 F					006																									
02 G					002						003		002		002					002		YES								
02 H		005	003		002				002	003	008		003		002		001						003			006		002		
02 I					001																					005				
02 J											003																			
02 X				MIS			MIS									MIS								MIS						
02 Y						C02						C02		C02							C02							C01		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A					002			001						000											002	001	004			
02 B					002			007			010		004	005		004	004	006	005		012			007	008	003		004	002	
02 C														000				005			010					003		004		
02 D					002	004					003			000					005									004		
02 E					002			015			004			005			004					004	005			001		004	004	
02 F					002						002			000							004				005		002		002	
02 G					001	002		003						005				005	003						010			004		
02 H					002	004			008		004			005			003	005	005		003				004			004		
02 I						004								000				001			001							004		
02 J					002	004								005				001										004		
02 X			MIS	UNK																										
02 Y	NON				C02			C02			C02		C02				C02				C02									C02

101

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A					003																									
03 B					003	008			001										005						010					
03 D			000			005			002						001		002													
03 E	006	001	003			005											002									005			003	
03 F					002																001									
03 G					004				003																					
03 H	004		003		002												002									002			003	
03 I					002																					005				
03 J																										005				
03 X				MIS			MIS									MIS								MIS						
03 Y								C02		C02	C02	C02	C02	C02				C02		C02		C02	C02					C02	C01		C02

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A														000											002					
03 B					001									000		008	004	003	003					005	008			002	001	
03 C														000			001	005										002		
03 D					001	002								000				003	003									002		
03 E					001									000			004	004				003	001					002	003	
03 F												004		000				001							005				001	
03 G														000				005	003						010			002		
03 H					001		005		003					000			002	005	003						004			002		
03 I														000				001										002		
03 J														000				001										002		
03 X			MIS	UNK																										
03 Y	NUN				C02			C02		C02	C02		C02	NUN	C02						C02	C02				C01	C02			C02

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
04 A					000	002		005																						
04 B	004				003	008								005					005		002	YES			000					
04 C	001									002				005												010	006			
04 D						005									001		005					YES				006				
04 E	010	002				005				002							005			010									003	
04 F					002			002														YES								
04 G					003	005						008						002								010				
04 H	005	002			001	015		003		002	005	012					005	001								008	005		003	
04 I					002													001												
04 J		001									003							001								010				
04 X				MIS			MIS									MIS								MIS						
04 Y			C02						C02				C02										C02					C01		C02

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
04 A																		002							002		002	000		005
04 B	010				001							010				002	002	010			015			002	008			000	001	
04 C	005																001	010		013								000		
04 D					001		005											010	002		007								000	
04 E	010				001		005	008		010							002	005			004	004	002					000	002	
04 F																		001							005		002	000	001	010
04 G	005																	010		010					010			000		
04 H	010						005		002								003	010	002		007				004			000		
04 I	005																	002			002							000		
04 J																		002		012								000		
04 X		MIS	UNK																											
04 Y				C02		C02					C02		C02	C02	C02											C01				

QUESTION 72 IN WHICH PROGRAMMING LANGUAGES AND AT WHAT LEVEL OF PROFICIENCY COULD THE PROJECT MANAGER PROGRAM?

01 HIGH
02 AVERAGE
03 LOW

A. FORTRAN
B. JOVIAL
C. COBOL
D. ASSEMBLER (UNSPECIFIED) (ADDED)
E. CMS-2 (ADDED)
F. PL/1 (ADDED)
G. HOL (UNSPECIFIED) (ADDED)
Y. NONE/NO PROJECT MANAGER (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	002	001	002	001	002			002	001	001	001	002	002	003	001	001	001	001	003				002	002		003	002			
01 B	002		002						002			003		003			001													
01 C				003	001			003	003	002	001	003	002	003							002									002
01 D	003	002	001		001	003		003	001	001	001	002		003	001	001	003				002		003	003	001	003	002		001	003
01 E	003	003	001																											
01 F																									001					
01 X							MIS																					MIS		
01 Y																				C02		C02								

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	003			003	001	001		002	001	003	001		001	002	002	003	002	001	001	002	001			001	001	001		001	003		
01 B	003							002									003	003				001		002	003				003		
01 C					001			003			001			003				003							003		001			003	
01 D	003				001	001	002	001	002		001		001	001	001	001	002	001	001	001	001	001		001	001	001	002	002			
01 E																							002							
01 F	003									002				001							002						001				
01 X		MIS	N/A																											
01 Y												C02																		
01 Z																001											001			

QUESTION 75 THE AGE OF PROJECT MANAGER AT THE BEGINNING OF THE PROJECT WAS******YRS

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	045	040	035	037	034	045	043	034	034	035	038	041	042	035	045	041	039	040	050	MIS	035	035	045	039	045	040	035	MIS	039	039

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	045	045	UNK	047	024	026	042	043	034	040	035	035	MIS	029	040	MIS	037	030	031	034	036	039	034	031	044	028	034	027	039	040

QUESTION 74 WAS THE PROJ MGR EVER A CHIEF PROGRAMMER (AS DEFINED BY BAKER, 1972) ?

A. YES
B. NO
Y. NO PROJECT MANAGER (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES						YES					YES									YES					
01 B	YES	YES	YES	YES		YES		YES		YES		YES	YES	YES	YES		YES	YES	YES		YES		YES	YES		YES	YES		YES	YES
01 X							MIS		MIS											MIS		MIS					MIS			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A															YES	YES					YES									
01 B	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES
01 X		UNK																												

QUESTION 75 DID THE PROJECT MANAGER RECEIVE TRAINING IN ANY OF THE FOLLOWING AREAS PRIOR TO (OR EARLY IN) THE PROJECT DEVELOPMENT CYCLE?

A. FUNCTIONAL AREA OF PROJECT
B. GENERAL DATA PROCESSING
C. MODERN PROGRAMMING TECHNIQUES
D. PROJECT MANAGEMENT
E. GENERAL MANAGEMENT
F. PROGRAMMING LANGUAGES (GIVE LANGUAGE)
Y. NONE/NO PROJECT MANAGER (ADDED)
Z. OTHER PROJECT RELATED AREA

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES	YES	YES				YES	YES	YES		YES		YES							YES	YES	YES	YES	YES			YES
01 B	YES			YES	YES					YES	YES	YES				YES		YES			YES		YES	YES	YES	YES				
01 C								YES			YES	YES						YES		YES	YES				YES		YES				
01 D	YES			YES		YES				YES	YES	YES	YES	YES		YES	YES			YES	YES				YES		YES				
01 E	YES			YES		YES			YES			YES	YES	YES			YES		YES	YES					YES					
01 F1			JOV	FOR							YES		FOR				FOR	FOR								PL1	YES				
01 X																												MIS			
01 Y		C02					C02								C02							NON							C02		
01 Z				OTH												OTH							OTH								

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					YES	YES		YES	YES	YES	YES			YES	YES			YES									YES	YES		
01 B						YES		YES					YES	YES	YES		YES									YES	YES		YES	
01 C						YES		YES		YES											YES			YES		YES	YES			
01 D	YES		YES					YES		YES	YES	YES			YES		YES	YES			YES	YES			YES		YES	YES	YES	
01 E	YES							YES	YES	YES	YES				YES		YES			YES			YES	YES	YES			YES	YES	
01 F1	FOR					FOR					HAL		FOR	FOR															YES	
01 F2						ASS								ASS																
01 X		MIS																												
01 Y				COS			C02									C02			C02											C02

QUESTION 76 HIGHEST EDUCATION LEVEL ATTAINED BY THE PROJECT MANAGER WAS?

A. LESS THAN HIGH SCHOOL
B. HIGH SCHOOL
C. AA DEGREE OR TWO YEARS OF COLLEGE
D. BETWEEN 2 AND 4 YEARS OF COLLEGE
E. BS/BA DEGREE
F. MASTERS DEGREE
G. MASTER DEGREE PLUS 30 HOURS OR DOCTORAL CANDIDATE
H. PHD (OR EQUIVALENT)
Y. DID NOT HAVE PROJECT MANAGER (ADDED)
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B																														YES
01 D							YES	YES																						
01 E	YES	YES				YES				YES											YES				YES					
01 F			YES	YES	YES				YES		YES		YES	YES					YES				C03			YES		YES		
01 G												YES			YES					YES				YES			YES		YES	
01 H																YES	YES	YES				YES								

	RESPONDOR																													
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 D					YES																				YES					
01 E			YES	YES		YES				YES	YES	YES			YES	YES	YES			YES		YES	YES	YES			YES	YES		
01 F	YES						YES	YES	YES				YES	YES				YES	YES							YES			C03	YES
01 G																					YES									
01 X		MIS																												

QUESTION 77 IF THE PROJECT MANAGER ATTENDED COLLEGE, HIS MAJOR OR SPECIALITY WAS?

A. COMPUTER SCIENCE
B. MATHEMATICS
C. ENGINEERING
D. PHYSICS (ADDED)
E. GENERAL SCIENCE (ADDED)
F. BUSINESS
G. LIBERAL ARTS
Y. DID NOT ATTEND/NO PROJECT MANAGER (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																					YES									
01 B					YES			YES	YES			YES							YES		YES				YES					
01 C		YES	YES			YES			YES	YES		YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES		YES		YES	YES	
01 D	C02																			C02						C02				
01 F				YES	YES																									
01 Y																														NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A														YES																
01 B								YES		YES		YES		YES							YES	YES		YES		YES				
01 C	YES			YES	YES	YES	YES		YES	YES		YES		YES		YES	YES	YES	YES	YES			C03		YES			YES		YES
01 D													C02																C02	
01 E								C02																						
01 F								YES																						YES
01 G			YES																							YES			
01 X		MIS																												

QUESTION 78

LIST THE NUMBER OF POSITIONS AUTHORIZED BY CATEGORY OVER THE LIFE OF THE PROJECT AND LIST NEXT TO THAT THE ACTUAL NUMBER OF INDIVIDUALS WHO OCCUPIED THESE POSITIONS (E.G., IF ONE PROJECT MANAGER POSITION WAS DESIGNATED, BUT DURING THE COURSE OF THE PROJECT THAT POSITION WAS OCCUPIED BY THREE INDIVIDUALS AT DIFFERENT TIMES THE ANSWER WOULD BE: (1) (3))

POSITION	01 AUTHORIZED	02 OCCUPIED BY
A. PROJECT MANAGER		
B. ASST PROJECT MANAGER (ADDED)		
C. FUNCTIONAL ANALYST (ENGINEER) (ADDED)		
D. DATA PROCESSING ANALYST		
E. PROGRAMMER		
F. SUPPORT LIBRARIAN		
G. SECRETARY		
H. ADMINISTRATOR		
I. USER/CUSTOMER (IF PART OF THE DEVELOPMENT TEAM)		
Y. NONE (ADDED)		
Z. OTHER		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	001	001		YES	001	001	001	001	001	001	001	001	001	001	001		001		001	001	001	001	001	001	001	001	001	001		001
01 B																				002		002								
01 C	005	010		YES	002	002	001		006					003					003	025	005		010	090	001	001	001			001
01 D	005			YES			001	006				002		002							005		020	040						001
01 E	025	020		YES	008	003	005	013	011	012		005		005	006		020		002	020	025	037	025	090	001	002	004			004
01 F	003			YES	002					001	001									001	001	001	002	010			001			000
01 G	001	001		YES	001	001		001			001						003			012	001	006	008	020						000
01 H	001		002	YES															001	003	001	002	001		001					000
01 I	003		008				002																							002
01 X																MIS													MIS	
01 Y																		C02												
01 Z		002																		015		018								

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	001			001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001	001		001	001	001	002
01 B	001																													
01 C	003		001		003		001	006	001	002	050		003	004	010	006	004	005	015	003		006	008	008		010	004	007	006	020
01 D	006		001					040		002	060				010	003	003				001			008			004	012	006	030
01 E	012			036	006	015	012	012	034	003	100		010			002	006	010	015	006	002	035	006	015	012	020	010	003	020	040
01 F	001							001	004	001	002							001		001		002					001		008	
01 G	001			002	001		001	001	001	001	004					001	002		001	001		003	001				001	001	002	005
01 H				001	001			001		001					001	001		001	001										002	005
01 I			004		002					004												005					004		006	
01 X		MIS																												
01 Y																						003								
01 Z								012		050																		008	010	

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A	002	002	003	002	001	002	001	001	002	001	002	002	002	002	001		002	YES	001	002	005	002	002	003	001	001		002		002
02 C	008	015		005	002		001		006					004				YES	003	100	010		010	270	001	001	002			001
02 D	007			003			001	006				002		002							010		020	120			005			005
02 E	035	050		006	008	004	005	016	011	020	020	008		007	008		040		002	060	050	037	025	270	001	002				003
02 F	003			001	002					001	001									002	002	002	002	030			002			000
02 G	001	000		001	001	002		003			002						006			020	004	006	012	060						000
02 H	001		003	001															001	004	002	002	003		002					000
02 I	004		013				002																							002
02 X																MIS													MIS	
02 Z		003																		013		020								

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A	002		003	001	001	001	002	001	001	001	002		001	001	001	002	002	003	001	001	001	002	002	003	001		001	001	002	002
02 B	001																													
02 C	004		002		005	002	001	006	001	002	060		003	004	012	009	006	007	020	003		012	010	010		015	004	008	008	020
02 D	008		003					040		002	075				011	005	003				005			012			004	012	008	030
02 E	015			036	008	020	012	012	042	003	150	002	010			006	008	015	017	006	004	045	010	020	012	030	010	003	022	040
02 F	003							001	001	001	004				003			002		001		002					001		003	
02 G	004			002	003		002	001	001	001	005				001	002	002	002	003	001		004	002				001	001	002	005
02 H				001	001			001		001					001	001			001										002	005
02 I			006		002					004												006					004		006	
02 X		MIS																												
02 Y																						005								
02 Z								012		050																		008	010	

QUESTION 79 WHAT WAS THE SOURCE (BY PERCENT) OF THE PROGRAMMER/ANALYST STAFF?

A. NEW HIRE FROM ANOTHER COMPANY ++++++++++%
B. NEW HIRE FROM SCHOOL ++++++++++%
C. TRANSFER FROM ANOTHER PROJECT ++++++++++%
D. TRANSFER FROM OTHER THAN ANOTHER PROJECT ++++++++++%
E. ADP STAFF (ADDED) ++++++++++%
F. SUBCONTRACTOR (ADDED) ++++++++++%
Z. OTHER ++++++++++%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	080	070	040		070	040					040		020		020		010				040	010		030					090	
01 B	010	010				020						040	010								015	090							005	
01 C	010	020	050	100	010		100	025		020	030	060	020	050	080		080	050	100		030		090	070					005	100
01 D			010		020	040		075		080			050	050				050			015		010		100		100			
01 E									100																					
01 F											030																			
01 X																MIS			MIS							MIS		MIS		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				098	015			040	005	010	010	035						025	015	010		015	015	020	025	005		031	050	
01 B			100	002	050				020	010	020				005			010	030	010		005	005		005	005		009	020	
01 C	100				025	030	100	030	075	070	070	055	100	100	090	100	100	065	055	080	100	070	080	070		080	075		030	
01 D					010	070		030							005							010		010	070	010	025	060		100
01 X		MIS																												

QUESTION 80 AT WHAT LEVEL WAS THE PROGRAMMER SUPPORT LIBRARIAN?

A. CLERK/PROGRAMMER TECHNICIAN
B. JUNIOR PROGRAMMER
C. SENIOR PROGRAMMER
Y. DID NOT USE PROGRAMMING SUPPORT LIBRARIAN
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES	YES					YES	YES										YES			YES						
01 B													YES											YES			YES			
01 C	YES																													
01 X																MIS				MIS		MIS				MIS		MIS		
01 Y		NON	NON			NON	NON	NON	NON			NON		C01	NON		NON	NON	NON						NON				C02	NON
01 Z																							OTH							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES					YES			YES	YES										YES		YES								
01 B								YES			YES		YES	YES	YES								YES				YES		YES	
01 C																			YES							C03				
01 X		MIS																MIS												
01 Y			C03	NON	NON		C01				NON					NON	NON				NON			NON	C03	C01				C01

QUESTION 81 THE CHIEF PROGRAMMERS WERE?

A. SENIOR PROGRAMMERS
B. FUNCTIONAL AREA EXPERTS
C. SPECIALLY TRAINED FOR TASK
Y. DID NOT USE CHIEF PROGRAMMERS
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES			YES	YES		YES	YES	YES	YES	YES		YES				YES	YES		YES			YES						
01 B		YES																YES						YES	YES					
01 X																MIS										MIS		MIS		
01 Y	NON		NON	NON				NON						NON	C01		NON			C01		C01	NON				NON		NON	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES		YES			YES		YES	YES			YES	YES	YES	YES	YES	YES		YES	YES		YES	YES	YES	YES	YES	YES
01 B		.			YES	YES		YES										YES										YES	YES	
01 C					YES																									
01 X		MIS																												
01 Y			C03				NON			NON			NON	NON							NON			NON						

QUESTION 82 WHAT WAS THE EDUCATION LEVEL OF THE PROGRAMMER/ANALYST (BY PERCENT)?

A. LESS THAN HIGH SCHOOL ********%
B. HIGH SCHOOL ********%
C. AA DEGREE OR TWO YEARS OF COLLEGE ********%
D. BETWEEN 2 AND 4 YEARS OF COLLEGE ********%
E. BS/BA DEGREE ********%
F. MASTERS DEGREE ********%
G. MASTERS DEGREE PLUS 30 HOURS OR DOCTORATE CANDIDATE ********%
H. PHD (OR EQUIVALENT) ********%
Z. OTHER ********%

RESPONDON PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		000																												
01 B	005	000																											004	022
01 C	005	010		100	010														100										005	022
01 D	010	010			010					010		020	005								010		005							
01 E	075	065			070	060	040	075	060	080	090	080	070	100	050	065	030				075		065	060	100	100	050		085	033
01 F	005	010			010	040	060	025	040	010	010		020		050	055	070	050			010		020	035			025		005	
01 G																					005		005							
01 H		005											005					050					005	005			025		001	
01 X																				MIS		MIS						MIS		
01 Z			OTH																											022

RESPONDON PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																														030
01 B				003																							050	010		015
01 C				003	015	005							020	020														010		020
01 D	004			003	025						010				010		030				020					005		020		010
01 E	084			079	050	090	100	090	080	080	070	085	080	080	070	070	060	040	055	070	080	070	080	060	080	070	025	060	040	005
01 F	012			006	010	005		010	015		010				020	020	010	040	028	020		030	020	030	020	015	025		050	025
01 G				003					003		010					010				010						005				
01 H				003					002									020	017					010		005				
01 X		MIS	N/A																											
01 Z										020																				

QUESTION 83 WHAT PERCENT OF THE PROGRAMMER/ANALYST STAFF WERE ORIGINALLY COMPUTER OPERATORS WHO MOVED DIRECTLY FROM MACHINE OPERATION TO PROGRAMMING? ++++++++++%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	004	001	000	015	020	000	000	000	000	000	000	000	005	050	000	000	000	000	000	MIS	005	MIS	001	003	025	MIS	000	MIS	001	055

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	004	MIS	000	003	000	005	000	000	000	UNK	005	000	000	000	010	000	005	000	000	010	000	000	000	000	010	010	010	000	003	002

QUESTION 84 DID THESE FORMER OPERATORS MAKE SUCCESSFUL PROGRAMMERS? (ORIGINALLY NARRATIVE)

A. YES, EXCELLENT
B. YES, GOOD/AVERAGE
C. YES, FAIR
D. NO, POOR
Y. DID NOT USE EX-OPERATORS AS PROGRAMMERS
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																													C02	
01 B	C02	C02		C02	C02								C02	C02							C02		C02	C02						C02
01 C																														C02
01 D																									C03					C02
01 X																				MIS		MIS				MIS		MIS		
01 Y			001			C01	C01	C01	C01	C01	C01	C01	C01		C01	C01	C01	C01	C01								C01			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A											C02				C02															
01 B	C02			C02													C02		C02						C02	C02	C02			C02
01 C																													C02	
01 D						C02;																								
01 X		MIS																												
01 Y			C01		C01		C01		C01	C01		C01	C01	C01		C01		C01	C01		C01		C01	C01	C01	C01			C01	
01 Z								C02																						

QUESTION 85

WERE THE FOLLOWING SERVICES PROVIDED FROM WITHIN THE PROJECT MGMT RESOURCES, OR SUPPLIED BY A STAFF FUNCTION WITHIN THE COMPANY? (INDICATE BY INSERTING W FOR WITHIN THE PROJECT RESOURCES, O FOR OUTSIDE THE PROJECT RESOURCES B FOR BOTH) (ADDED)

A. PERSONNEL
B. ACCOUNTING
C. BUDGETING
D. COMPUTER OPERATION
E. TRAVEL ARRANGEMENT
F. TRAINING
G. TYPING
Y. NONE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	OOO	WWW	OOO	WWW	OOO	OOO	WWW	WWW	OOO	OOO	OOO	WWW	OOO	OOO	OOO	OOO	OOO	WWW	WWW	OOO	OOO	OOO	OOO	OOO	OOO	WWW	OOO	OOO	WWW	OOO
01 B	OOO	OOO	OOO	WWW	OOO	OOO	OOO	OOO	OOO	OOO	OOO	WWW	OOO	OOO	OOO	OOO	OOO	WWW	WWW	WWW	OOO	WWW	BBB	OOO	OOO	OOO	OOO	OOO	WWW	OOO
01 C	BBB	WWW	OOO	WWW	OOO	OOO	WWW	WWW	OOO	OOO	OOO	WWW	WWW	OOO	WWW	OOO	OOO	WWW	WWW	WWW	OOO	WWW	WWW	WWW	OOO	WWW	WWW	OOO	OOO	WWW	OOO
01 D	WWW	OOO	OOO	WWW	WWW	WWW	OOO	OOO	WWW	WWW	WWW	OOO	WWW		OOO	OOO	OOO	WWW	WWW	WWW	OOO	WWW	WWW	WWW	WWW	WWW	OOO	OOO	WWW	OOO
01 E	WWW	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	OOO	OOO	WWW	OOO	OOO	OOO	OOO	OOO	WWW	WWW	WWW	BBB	OOO	BBB	OOO	WWW	OOO	OOO	OOO	WWW	OOO
01 F	WWW	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	WWW	WWW		WWW	OOO	OOO	BBB	OOO	WWW	WWW	BBB	BBB	WWW		OOO	WWW		WWW	OOO	WWW	OOO
01 G	WWW	WWW	WWW	WWW	WWW	WWW	OOO	OOO	OOO	WWW	WWW	WWW	WWW	OOO	WWW	OOO	WWW	WWW	WWW		WWW		WWW	WWW	WWW	OOO	WWW	WWW	WWW	OOO
01 Z																OOO			WWW											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	OOO		OOO	OOO	OOO	OOO	WWW	OOO	WWW	OOO	WWW	WWW	OOO	OOO	OOO	OOO	OOO	WWW	OOO	WWW	OOO	OOO	OOO	OOO	OOO	WWW	OOO	OOO	OOO	OOO
01 B	OOO		OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	WWW	WWW	OOO	OOO	WWW	OOO	OOO	OOO	WWW	WWW	OOO	OOO	BBB	OOO	OOO	OOO	OOO
01 C	WWW		OOO	WWW	WWW	WWW	WWW	WWW	OOO	OOO	WWW	OOO	OOO	WWW	WWW	WWW	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	OOO	OOO	WWW	OOO	OOO	WWW	OOO
01 D			OOO	OOO	WWW	WWW	BBB	WWW	OOO	OOO	OOO	WWW	OOO	WWW	WWW	WWW	WWW	WWW	WWW	WWW	WWW	OOO	OOO	OOO	OOO	OOO	WWW	WWW	WWW	OOO
01 E	WWW		OOO	WWW	WWW	OOO	WWW	OOO	WWW	OOO	WWW	OOO	OOO	WWW	WWW	WWW	OOO	WWW	WWW	WWW	WWW	OOO	OOO	OOO	WWW	WWW	OOO	OOO	OOO	BBB
01 F	WWW		OOO	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	WWW	WWW		WWW	OOO	WWW		OOO	WWW	OOO	OOO	OOO	WWW	BBB	WWW	OOO	WWW	WWW	
01 G	WWW		OOO	WWW	WWW	OOO	WWW	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	WWW	WWW	WWW	WWW	OOO	WWW	WWW	WWW	OOO	OOO	OOO	WWW	WWW	WWW	WWW
01 X		MIS																												
01 Z				WWW																										

QUESTION 86 WAS THE PROJECT MANAGER RESPONSIBLE FOR IDENTIFYING TRAINING REQUIREMENT OF THE DEVELOPMENT TEAM MEMBERS?

A. YES
B. NO
Y. THERE WAS NO TRAINING REQUIREMENTS OR NO PROJECT MANAGER (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES		C05	YES			YES	YES	YES		YES	YES	YES		YES
01 B							YES							YES			YES			YES					YES				YES	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	YES		YES	YES	YES		YES	YES	YES	YES	YES			YES	YES	YES	YES
01 B			C01																YES						YES	YES				
01 X		MIS																												
01 Y										C02					C02															

QUESTION 87

TRAINING REQUIREMENTS GENERATED AS A RESULT OF THE PROJECT WERE SATISFIED FROM WHICH OF THE FOLLOWING SOURCES? (INSERT 0 FOR METHODS/SOURCES NOT EMPLOYED AND RANK ORDER THE REMAINING METHODS/SOURCES WITH 1 BEING THE MOST IMPORTANT)

A. ON THE JOB TRAINING
B. CLASSES CONDUCTED BY PROJECT TEAM MEMBERS
C. CLASSES CONDUCTED BY COMPANY CADRE
D. CLASSES CONDUCTED BY THE SYSTEM USER
E. CLASSES CONDUCTED BY INDEPENDENT TRAINING CONSULTANTS
F. CLASSES CONDUCTED BY HARDWARE/SOFTWARE VENDORS
G. CLASSES CONDUCTED BY COLLEGES/UNIVERSITIES
Y. NONE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	001	001	001	003	001	001	001	001	004	001	001	001			001	001	001		001	001	001	001	002	001	001	001	001	001	001	002
01 B	002	002	000	000	002		000	002	002	000	003		003				000			002	002	000	001	002	003		001	002	001	001
01 C	003	000	000	000	000		000	000	000	002	000		002		000		000			003		000	000				000			000
01 D	000	003	000	000	000		000	004	003	000	000		001		000		000			000	000	000	000				001			000
01 E	000	000	000	001	000		000	000	000	000	002				000		000			000	004	000	000		002		000			000
01 F	000	000	000	002	000	002	000	003	001	000	000		001		001	002	002			000	005	000	003	003			000	003		003
01 G	000	000	000	000	000		000	000	000	000	000				000		000			000	000	000	000				000	004		000
01 X														MIS																
01 Y																		C02												

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES		001	002	001	001	001	002	001	001	001		001	001	001	001	001	002	001	001	001	001	001	001	001	001	005	004	001	001
01 B	YES			001	002	002	000	001	000	000	001		002	000	000	000	000	001		000	000	002	002	002	008	002	001	001	003	000
01 C				000		000	000	000	000	000	002		000	000	000	000	002	000		000	000	000	000		000	000	002	005	002	000
01 D				000		000	000	000	000	000	000		000	000	000	000	000	000		000	000	000	000	003	000	005	093	000	000	003
01 E				000		000	000	003	002	000	001	001	000	000	000	000	000	000		000	000	000	000		000	000	000	000	000	000
01 F				003		003	000	003	003	000	001		000	000	000	000	003	004		002	000	000	000	004	000	000	004	002	000	002
01 G				000		000	000	000	000	002	000		000	000	000	000	000	005		000	000	000	000	005	000	000	000	000	004	
01 X		MIS																												
01 Z										003																				

QUESTION 88 WHAT PERCENT OF THE PERSONNEL ASSIGNED TO THE PROJECT RECEIVED ADDITIONAL TRAINING IN THE PROGRAMMING LANGUAGE SELECTED? **********%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	100	050	050	100	050	040	010	020	075	000	075	100	080	000	100	100	000	000	000	000	020	000	050	050	050	000	100	100	MIS	100

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	000	MIS	000	000	050	100	000	000	075	100	090	000	000	072	000	010	075	010	000	000	020	005	050	025	000	020	000	040	000	015

QUESTION 89 WHAT PERCENT OF THE PERSONNEL ASSIGNED TO THE PROJECT REQUIRED ADDITIONAL TRAINING ON THE OPERATING SYSTEM THAT WAS USED?**********%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	100	100	100	100	080	000	080	100	100	000	100	050	050	100	100	030	005	000	000	MIS	020	095	050	020	025	000	100	MIS	MIS	100

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	008	MIS	100	000	000	100	000	100	050	010	010	000	000	072	000	100	000	050	000	010	020	100	100	050	000	020	050	050	060	010

QUESTION 90 IF IT WERE WITHIN YOUR POWER TO MAKE ANY CHANGES, OR INITIATE ANY RESEARCH IN THE AREA OF STAFFING, WHAT WOULD YOU CONSIDER THE MOST FRUITFUL AREA FOR MODIFICATION OR STUDY?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	S2B	MIS	S1M	07F	SHC	MIS	DHA	MIS	MIS	MIS	MIS	MIS	S1E	MIS	S1G	MIS	S1H	MIS	MIS	MIS	MIS	MIS	SHD	MIS	MIS	MIS	S1A	S1A
01 002			S2C		S1B												S1I												S2B	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	SHD	MIS	S1J	S1E	07E	MIS	N/A	OHC	MIS	X9J	S1E	S1A	S1D	MIS	S1C	S1C	S1A	S1H	MIS	MIS	MIS	S1F	S1F	MIS	MIS	S1B	MIS	S1A	MIS	S1H
01 002			S1K		07F			S1A			S1D				SHB													05H		S1A
01 003																												09B		S1L
01 004																												09C		

QUESTION 91

WHICH OF THE FOLLOWING AUTOMATED OR MANUAL SYSTEMS WERE USED FOR PROJECT CONTROL?

A. PERT
B. MODIFIED PERT
C. CPM (CORR)
D. GANTT CHARTS
E. CSCS (ADDED)
F. WBS (ADDED)
G. GRAPHS/RATE CHARTS (ADDED)
H. WORKLOADING
I. MILESTONE TRACKING
Y. NO PROJECT CONTROL
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A													YES								YES			YES						
01 B		YES	YES		YES	YES		YES								YES						YES								
01 C																							YES							
01 D		YES	YES			YES				YES	YES	YES	YES		YES						YES			YES				YES		
01 E												C02								C02				C02						
01 F																				C02										
01 G						C02					YES									C02										
01 H		YES				YES		YES	YES						YES	YES	YES					YES		YES					YES		
01 I	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES		YES	YES	YES		YES			YES	YES		YES
01 X																									MIS					
01 Y				NON										NON					NON						NON			NON		
01 Z	OTH												OTH			OTH				OTH										

PART/SUB	RESPONDUR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES								YES					YES										YES		YES				
01 B						YES					YES							YES	YES									YES	YES	YES
01 C			C03											YES																
01 D				YES		YES		YES		YES				C02			YES										YES	YES		
01 E		YES																												
01 F																												C02		
01 H	YES				YES			YES			YES							YES	YES	YES				YES	YES		YES	YES	YES	
01 I	YES			YES	YES		YES	YES	YES	YES	YES				YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES
01 Y												NON	NON			NON							C03							

QUESTION 92 WAS A WORK BREAKDOWN STRUCTURE CODE USED IN THE CONTROL OF SYSTEM DEVELOPMENT?

A. YES
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES			YES			YES	YES	YES	YES	YES		YES	YES		YES		YES		YES	YES	YES	YES	YES				
01 B				YES	YES		YES	YES						YES			YES		YES		YES						YES	YES	YES	YES

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES		YES	YES			YES	YES	YES			YES	YES		YES	YES	YES	YES		YES	YES	YES				YES	YES	
01 B	YES			YES			YES	YES				YES	YES			YES					YES				YES	YES	YES			YES

QUESTION 93

WHICH MANUAL REPORTING PROCEDURES WERE USED IN PROJECT MONITORING AND MANAGEMENT? AT WHAT LEVEL DID THEY ORIGINATE AND HOW HIGH DID THEY GO? HOW OFTEN WERE THEY AGGREGATED, CONDENSED, OR EDITED AS THEY MOVED THROUGH THE CHAIN?

	REPORT TITLE	01 LOWEST ORIGINATOR	02 HIGHEST RECIPIENT	03 NO. OF AGGS/EDITS
A.	WEEKLY/MONTHLY ACTIVITY			
B.	PROJECT STATUS			
C.	SIGNIFICANT CHG			
D.	COST VS PERFORMANCE (ADDED)			
E.				
F.				
Y.	NONE/UNKNOWN (ADDED)			
Z.	OTHER			

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	WOR	CPR	FLS	PMR	CPA	CPR	CPR	CPR	PMR	CPR	CPR	CPR	FLS		FLS	PMS	LSE	YES			FLS		PMS	CPA			CPR	PMR		
01 B	FLS		PMR	PMR	PMR	LPA	LSA	PMR	PMR	PMR	PEN	LSW	FLS		PEN	PMS	PMW				FLS		PMS	CPA	YES		CPR	PMR	FLS	PMR
01 C	PMR				CPR		FLS	PMR				FLS			PEN		PMW				FLS			CPA			CPR			
01 D											SAC																			
01 X																				MIS		MIS				MIS				
01 Y														NON					NON											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	CPR		ENG	FIC	CPR	WOR		FLS	ENG	LSE	CPR		FLS		FLS		FLS	CPA	WOR	CHP	WOR	FLS	FLS		FLS		FLS	WOR	WOR	FLS
01 B	PMR			FIC	CHP	PMR	CPR	SPC	ENG	PEN	SPC			CPR	FLS		PMR	CPA	FLS	PMR	PMR	FLS	FLS	LSE	FLS	LSE	PMR	WOR	FLS	MCP
01 C				FIC		WOR	CPR	FLS	ENG		FLS						PMR				PMR	WOR	FLS	LSE	FLS		PMR	WOR	FLS	MCP
01 X			MIS																											
01 Y												NON				NON														

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A	PMR	PMR	PMR	MCP	MGR	MGR	VPG	PMR	PMR	PMR	PEN	ESM	MGR		VPG	VPG	PMR	YES			MGR		PMR	PMR			PMR	VPE		
02 B	PMR		VPG	MCP	MGR	MGR	VPG	MGR	PMR	MGR	MGR	PMS	MGR		VPG	OCU	PMR				MGR		OCU	PMR	YES		PMR	VPG	PMR	MCP
02 C	PMR					PMR		MGR	PMR				MGR		VPG		PMR				MGR			PMR			PMR			
02 D											PEN																			
02 X																				MIS		MIS				MIS				
02 Y														C01					NON											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A	PMR		PMR	PMR	PMR	PMR		PMR	OCU	PEN	FLS		PMR		MPD		MGR	MGR	VPG	PMR	PMR	PMR	PMR		PMR		VPG	PMR	PMR	MGR
02 B	MGR			VPG	PMR		PMR	VPG	OCU	MEN	MEN			FLS	OCU		MGR	MGR	VPG	VPG	VPG	PMR	PMR	FLS	PMR	PMR	VPG	VPC	PMR	VPG
02 C				VPG		PMR	PMR	PMR	PMS		PMR						MGR				VPG	FLS	PMR	FLS	PMR		VPG	VPC	PMR	VPG
02 X		MIS																												
02 Y												NON				NON														

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A	005	003	001		002	003	001	001	002	000	000	000			004	002	004	YES			001		001		000			004		
03 B	002		002		001	005	005	001	002	002	002	000			003	002	002				001		002					005		001
03 C	000					003		001	002						002		002				001									
03 D											000																			
03 X																				MIS		MIS				MIS				
03 Y				NON									NON	C01					NON					NON			NON		NON	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A	000		000	001	000	000		002		001			003		005		001	003	006	001	000	002	001				001	001	002	
03 B				002	001	000		001		001				001	006		000	003	005	001	001	002	001			001	001	005	001	
03 C				002		000		002									000				001	001	001				001	005	001	
03 X		MIS																												
03 Y							NON				NON	NON				NON								NON	NON					C01

QUESTION 94 WHICH AUTOMATED REPORTING SYSTEMS WERE USED IN PROJECT MONITORING AND MANAGEMENT?

	01 LOWEST ORIGINATOR	02 HIGHEST RECIPIENT
A. MANHOUR BY ACTIVITY (E.G., CODE, FLOW DIAGRAM, ETC.)		
B. MANDAY BY TASK (E.G., PREPARE USERS GUIDE, DESIGN DATA BASE, ETC.)		
Y. NONE/UNKNOWN		
Z. OTHER		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	WOR	CPR				LSP	CPR	CPR	CPA	SAC	SAC		ENG		YES			YES					WOR		YES					
01 B									CPA	SAC	SAC	ESW	ENG			WOR								CPA	YES					
01 X																				MIS		MIS				MIS		MIS		
01 Y			NON	NON	NON									COI			NON		NON								NON		NON	NON
01 Z																					FES									

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			ENG					WOR			CPR							LSP	YES										WOR		
01 B											SPC		CPR	FES	CPR	CPR				FES					WOR			WOR	WOR	WOR
01 X		MIS								MIS																				
01 Y	NON			NON	NON	NON	NON		NON			COI							NON		NON	NON	NON	NON		NON	NON		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A	PMR	PMR				PMR	PMR	PMR	PMR	PMR	PEN		PMR		YES			YES					PMR		YES					
02 B									PMR	PMR	PEN	PMC	FLS			VPC								PMR	YES					
02 X																				MIS		MIS				MIS		MIS		
02 Y			NON	NON	NON									COI			NON		NON								NON		NON	NON
02 Z																					MGR									

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A			PMR					SPC		WDR	PMR						MGR											PMR		
02 B										PEN	PMR		PMR	PEN	PMR	PMR				PMR					PMR			VPC	PMR	MCP
02 X		MIS																MIS												
02 Y	NON			NON	NON	NON	NON		NON			COI							NON		NON	NON	NON	NON		NON	NON			

QUESTION 95 IN MONITORING SYSTEM DEVELOPMENT, SYSTEM SOFTWARE WAS USED TO:

A. COUNT COMPILES PER MODULE
B. COUNT LINES OF CODE PRODUCED
C. CHECK FOR ADHERENCE TO CODING CONVENTIONS
D. CHECK FOR USE OF STANDARD DATA ELEMENT NAMES
E. PERFORM MANHOUR/COST ACCOUNTING (ADDED)
F. CHECK PERFORMANCE (ADDED)
G. MONITOR CHANGES (ADDED)
Y. DID NOT USE SOFTWARE TO MONITOR SYSTEM DEVELOPMENT
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																					YES	YES		YES						
01 B	YES												YES									YES		YES						
01 C	YES	YES					YES				YES		YES					YES						YES						
01 D	YES	YES					YES				YES		YES									YES		YES						
01 E																									C02					
01 G																											C02			
01 X																			MIS							MIS		MIS		
01 Y			NON	NON	NON	NON	NON		NON	NON	NON	NON		C01	NON		NON		NON				NON						NON	NON
01 Z																OTH														

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A											YES												YES				YES		YES	
01 B										YES	YES						YES										YES			YES
01 C											YES						YES	YES												
01 D										YES	YES						YES	YES		YES							YES		YES	YES
01 F																								C02						
01 G	YES																													
01 X		UNK																												
01 Y				NON	NON	NON	NON		NON			NON	NON	NON	NON	C03			NON		NON	NON			NON	NON		NON		
01 Z			OTH					OTH																						

QUESTION 96 LIST PRODUCTIVITY INDEXES SUCH AS LINES OF CODE, PROGRAM ERRORS, SOURCES OF ERRORS, TURN AROUNDS REQUIRED PER COMPLETED TASK, ETC., THAT WERE EMPLOYED IN MONITORING PERFORMANCE. (ORIGIONALLY NARRATIVE)

A. LINES OF CODE (PER UNIT OF TIME)
B. MODULES COMPILED (PER UNIT OF TIME)
C. PROGRAM ERRORS
D. COMPUTER TIME USED
E. DOCUMENTED PAGES
Y. DID NOT USE PRODUCTIVITY INDEXES
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	C02	C02			C02	C02				C02	C02	C02	C02											C02			C02			
01 B						C02				C02	C02													C02			C02			
01 C	C02					C02							C02						C02	C02				C02						
01 D	C02												C02									YES		C02						
01 E	C02																							C02						
01 X																MIS			MIS							MIS		MIS		
01 Y			NON	NON			NON	NON	NON					C01	NON		NON				NON		NON		NON				NON	NON
01 Z						C02																OTH								

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			C02					C02									C02						C02	C02					C02	C02
01 B																						C02								
01 C																							C02							
01 E																								C02						
01 X		UNK																		MIS										
01 Y	NON			NON	NON	NON	NON			NON	NON	NON	NON	NON	NON	NON	C03		NON	NON		NON			NON	NON	NON	NON		

QUESTION 97 SPECIFIC STANDARDS EMPLOYED DURING THE COURSE OF THE PROJECT WERE DEVELOPED, ADAPTED, OR DIRECTED BY: 1

STANDARD	01 PROJECT MANAGER	02 COMPANY	03 USER	04 WAS NONE
A. DATA NAMES				
B. CODING				
C. PROGRAMMING				
D. DOCUMENTATION				
E. TESTING				
F. MANAGEMENT REPORT				
G. CONFIGURATION CONTROL (ADDED)				
H. QUALITY ASSURANCE (ADDED)				
Y. NO STANDARDS (ADDED)				
Z. OTHER				

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES			YES	YES	YES					YES	YES					YES		YES	YES	YES		YES	YES		
01 B	YES	YES		YES	YES	YES			YES	YES	YES	YES			YES	YES					YES		YES	YES	YES		YES	YES		
01 C	YES	YES		YES	YES			YES	YES	YES	YES	YES			YES	YES					YES		YES	YES	YES		YES	YES		
01 D		YES	YES	YES	YES			YES				YES			YES	YES				YES	YES		YES	YES	YES		YES	YES		
01 E		YES		YES	YES	YES		YES	YES	YES					YES	YES					YES			YES	YES		YES	YES	YES	
01 F		YES	YES					YES	YES	YES						YES					YES			YES	YES		YES		YES	
01 G																				C02										
01 H																				C02										
01 X																									MIS					
01 Y						C02						C02	C01			C02	C02	C02			NON								C02	

PART/SUB	RESPONDUR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES					YES		YES	YES				YES		YES	YES	YES	YES	YES			YES	YES					YES	YES	
01 B	YES			YES	YES	YES		YES	YES				YES		YES	YES	YES	YES	YES			YES	YES	YES			YES		YES	
01 C	YES			YES	YES	YES		YES	YES				YES		YES	YES		YES				YES	YES	YES			YES		YES	
01 D	YES			YES		YES		YES		YES			YES		YES	YES	YES				YES	YES		YES		YES				
01 E				YES	YES	YES		YES	YES	YES			YES		YES	YES	YES		YES			YES	YES	YES			YES	YES	YES	YES
01 F				YES	YES			YES	YES	YES	YES		YES									YES				YES	YES			YES
01 G	C02																													
01 X		MIS										MIS																		
01 Y			C02				C02							C02						C02					C02					

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A													YES					YES				YES								
02 B													YES					YES		YES		YES								YES
02 C						YES							YES					YES			YES	YES								YES
02 D						YES			YES	YES			YES			YES				YES	YES	YES								YES
02 E			YES										YES			YES					YES	YES								YES
02 F	YES			YES		YES									YES	YES					YES		YES							YES
02 G						C02														C02										
02 H																				C02										
02 X																										MIS				
02 Y		C02			C02		C02	C02			C02	C02		C01			C02		C02					C02	C02		C02	C02	C02	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A																				YES							YES			YES
02 B																				YES								YES		YES
02 C																			YES	YES						YES		YES		YES
02 D									YES	YES	YES							YES	YES	YES					YES		YES	YES		YES
02 E											YES							YES	YES	YES					YES					YES
02 F								YES										YES	YES				YES		YES			YES	YES	
02 H	C02																													
02 X		MIS										MIS																		
02 Y				C02	C02	C02	C02						C02	C02	C02	C02	C02				C02	C02		C02						
02 Z			OTH																											

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A																					YES	YES			YES					
03 B						YES																YES								
03 C																						YES								
03 D	YES										YES					YES	YES	YES		YES		YES			YES				YES	
03 E	YES										YES					YES						YES								
03 F											YES					YES														
03 X																										MIS				
03 Y		C02	C02	C02	C02	C02	C02	C02	C02	C02		C02	C02	C01	C02				C02				C02	C02			C02	C02		C02

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A				YES	YES	YES				YES	YES																			
03 B								YES		YES	YES																			
03 C								YES			YES																			
03 D								YES						YES									YES						YES	
03 E								YES			YES			YES																
03 F																YES												YES		
03 X		MIS										MIS																		
03 Y	C02						C02		C02				C02		C02		C02	C02	C02	C02	C02	C02		C02	C02	C02	C02			C02
03 Z			OTH																											

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
04 A						YES	YES				YES						YES		YES	YES										
04 B							YES										YES		YES											
04 C							YES										YES		YES											
04 D							YES												YES											
04 E							YES										YES	YES	YES											
04 F							YES										YES	YES												
04 G							C02										C02	C02	C02											
04 H							C02										C02	C02	C02											
04 X																										MIS				
04 Y	C02	C02	C02	C02	C02			C02	C02	C02		C02	C02	C01	C02	C02					C02	NON	C02	C02	C02		C02	C02	C02	C02	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
04 A							YES							YES											YES	YES				
04 B							YES							YES											YES	YES				
04 C							YES							YES											YES					
04 D							YES																							
04 E							YES																			YES				
04 F							YES							YES						YES										
04 X		MIS										MIS																		
04 Y	C02		C02	C02	C02	C02		C02	C02	C02	C02		C02		C02	C02	C02	C02	C02		C02	C02	C02	C02			C02	C02	C02	C02

QUESTION 98 WHICH OF THE FOLLOWING WERE RECOGNIZED AS DISTINCT PHASES IN THE DEVELOPMENT EFFORT? (AFR 500-15, 1978)

A. SYSTEM DEFINITION
B. REQUIREMENTS DEFINITION
C. PRELIMINARY DESIGN (ADDED)
D. DETAIL DESIGN (ADDED)
E. SYSTEM DESIGN
F. MODULE DESIGN
G. CODING
H. MODULE TEST
I. SUBSYSTEM INTEGRATION
J. SYSTEM INTEGRATION
K. SYSTEM TEST
L. ACCEPTANCE (ADDED)
M. VALIDATION (ADDED)
N. OPERATION
O. MAINTENANCE (ADDED)
Y. DEVELOPMENT WAS NOT DIVIDED INTO (RECOGNIZED) PHASES (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES	YES	YES		YES			YES	YES	YES	YES		YES		YES			YES		YES	YES	YES	YES		YES	YES	
01 B	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 C																							C02			YES				YES
01 D																							C02			YES				YES
01 E	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 F	YES	YES	YES		YES	YES		YES	YES	YES	YES	YES	YES			YES	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 G	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 H	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 I	YES	YES	YES		YES	YES		YES	YES		YES	YES	YES	YES		YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 J	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	
01 K	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES		YES	YES	YES	
01 L												C02																		
01 M												C02																		
01 N	YES			YES	YES	YES	YES		YES	YES			YES		YES	YES	YES				YES	YES	YES	YES	YES		YES	YES	YES	
01 O																							C02							
01 Z																				OTH										

PART/SUB	RESPONDENT 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES		YES	YES	YES	YES		YES	YES	C03	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES
01 B	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES			YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 C	C02									C02																				
01 D	C02									C03																				
01 E		YES		YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES		YES	YES		
01 F	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES				YES	YES	YES		YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	
01 G	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES
01 H	YES	YES	YES	YES	YES	YES		YES	YES	C03	YES			YES	YES	YES	YES		YES	YES		YES	YES		YES	YES	YES	YES	YES	
01 I	YES	YES	YES	YES	YES	YES		YES	YES	C03	YES				YES		YES	YES				YES	YES		YES	YES	YES	YES	YES	
01 J	YES	YES	YES	YES	YES	YES		YES	YES	C03	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
01 K	YES	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 L	C02																							YES						C02
01 M	C02																													
01 N		YES	YES	YES	YES	YES	YES	YES	YES	C03		YES		YES			YES					YES	YES	YES	YES	YES	YES		YES	YES
01 O				C02																										
01 Z				OTH												OTH														

QUESTION 99

TASK ASSIGNMENT

ACTION/FREQUENCY 01 02 03 04 05 06

A. WERE TASK ASSIGNMENTS TO THE PROJECT TEAMS GIVEN IN WRITING?

B. WERE REQUIRED COMPLETION DATES INCLUDED WITH EACH WRITTEN TEAM TASK ASSIGNMENT

C. WERE WRITTEN TEAM TASK ASSIGNMENTS PREPARED IN SUCH A WAY THAT THE RELATIONSHIP OF THE TASK TO THE NEXT HIGHER LEVEL TASK WAS CLEARLY DELINEATED?

D. WERE TASK ASSIGNMENTS GIVEN TO INDIVIDUAL TEAM MEMBERS IN WRITING?

E. WERE REQUIRED COMPLETION DATES INCLUDED WITH EACH INDIVIDUAL TEAM MEMBER'S WRITTEN TASK ASSIGNMENT?

F. WERE INDIVIDUAL TEAM MEMBERS WRITTEN TASK ASSIGNMENTS PREPARED IN SUCH A WAY THAT THE RELATIONSHIP OF THE TASK TO THE NEXT HIGHER LEVEL TASK WAS CLEARLY DELINEATED?

Y. NO TEAM (ADDED)

Z. COMMENT

01 = ALWAYS
02 = MOST OF THE TIME
03 = ABOUT 1/2 OF TIME
04 = LESS THAN 1/2 OF TIME
05 = SELDOM
06 = NEVER

	RESPONDOR																												
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	001	002	005	004	002	002		002	002	005		003	003	006	002	001	005	001	002	001	005	002	003	001	001		001	002	005	005
01 B	001	002		001	002	002		002	002	002		001	003	006	002	001	005	001	002	001	001	001	001	001	002		003	002	002	006
01 C	001	004	005	005	002	001		005	003	005		003	004	006	002	001	005	001	002	005		003	002		002		002	002	002	005
01 D	005	002	006	006	002	002	001	002	002	002		003	006	005	005	004	004	001	002	002		005	005	001	001		004	002	005	005
01 E	001	002		006	002	002	001	002	001			001	006	006	003	001	004	001	002	002		005	003	003	002		002	002	002	006
01 F	001	004		006	002	001	006	005	002			003	006	006	002	002	005	001	002	002		005	003	003	001		002	002	002	006
01 X																										MIS				
01 Y						C02				C02																				

PART/SUB	RESPONDOM 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	005			005	004	002	006	001	002	003	001	002	004	005	002	006	004	003	006	004	002	002	002	003	002	001	005	002	002	005
01 B	002			001	001	002	005	001	001	002	002	001	005	002	002	006	002	002		002	002	002	002	001	002	001	001	001	002	005
01 C	006			001	002	002		001	001	003	002	006	006	006	002		005	002		002	003	004	003	004	002	002	003	002	001	005
01 D	005			005	005	005	006	004	004	005	002	002	006	006	004	006	005	003		004	005	005	004	004	002	005	005	003	003	005
01 E	002			005		002		001	002	002	002	002	006		002		002	002		002		005	004	001	002	002	003	002	002	005
01 F	006			005		002		001	002	003	002	005	006		004		005	002		002		005	005	004	002		003	003	003	005
01 X		MIS	MIS																											

QUESTION 100

WERE TASK WORK TIME ESTIMATES PROVIDED AT THE TIME OF TASK ASSIGNMENT OR DID INDIVIDUAL TEAM MEMBERS PROVIDE TIME ESTIMATES AFTER REVIEWING THIS ASSIGNMENT?

A. TIME AND TASK ASSIGNED
B. TIME AND TASK ASSIGNED WITH VERIFICATION OR MODIFICATION OF TIME ALLOTTED BEING PROVIDED BY INDIVIDUAL TEAM MEMBER AS A MATTER OF PROCEDURE
C. INDIVIDUAL TEAM MEMBER PROVIDED THE TIME ESTIMATE FOR EACH TASK ASSIGNED
Y. NO EFFORT WAS MADE TO DETERMINE TIME REQUIREMENTS FOR INDIVIDUAL TASKS
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES		YES		YES		YES	YES				YES	YES			YES			YES		YES									
01 B						YES					YES							YES		YES	YES	YES	YES	YES			YES	YES		
01 C		YES							YES									YES							YES	YES			YES	
01 Y				NON						NON				NON	NON		NON													NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A									YES	YES		YES			YES			YES										COS		YES
01 B	YES			YES	YES	YES		YES						YES		YES	YES		YES		YES	YES	YES		YES		YES			
01 C							YES				YES		YES							YES				YES		YES	YES		YES		
01 X		MIS	MIS																											

QUESTION 101 AT WHAT INTERVALS WERE TASK ASSIGNMENTS MADE TO INDIVIDUAL TEAM MEMBERS

A. EVERY 5 WORK DAYS
B. EVERY 10 WORK DAYS
C. EVERY MONTH
D. AS TASKS WERE DEVELOPED AND DEFINED
E. AS RESOURCES BECAME AVAILABLE TO WORK ON THE TASK
Y. TASK ASSIGNMENT NOT MADE TO INDIVIDUAL TEAM MEMBERS (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B														YES																
01 C								YES										YES							YES					
01 D	YES	YES		YES	YES	YES	YES		YES	YES	YES		YES						YES	YES	YES	YES	YES	YES			YES	YES	YES	YES
01 E	YES	YES	YES			YES	YES								YES	YES	YES										YES			YES
01 X																										MIS				
01 Y												C02																		
01 Z																OTH				OTH										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																			YES		YES									
01 B									YES									YES					YES							
01 D	YES					YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES	YES				YES	YES	YES	YES		YES	YES
01 E	YES			YES	YES									YES		YES													YES	YES
01 X		MIS	MIS																											
01 Z																												OTH		

QUESTION 102

WERE PROCEDURES USED IN WHICH PROGRAMMERS OR ANALYSTS BID ON SPECIFIC TASKS IN THE DEVELOPMENT PROJECTS? (E.G. "I'LL WRITE THE EDIT PROGRAM FOR $1,217.12")

A. YES
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																									YES					
01 B	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES			YES	YES	YES	YES
01 X																				MIS						MIS				

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A								YES																						
01 B	YES			YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 X		MIS	MIS																											

QUESTION 103 IF BIDDING AS DESCRIBED ABOVE WAS EMPLOYED, HOW SUCCESSFUL WAS IT?

A. VERY
B. MODERATELY
C. UNSUCCESSFUL
Y. NOT EMPLOYED
Z. USEFUL ONLY UNDER THE FOLLOWING CONDITION(S)

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B																									YES					
01 X																				MIS						MIS				
01 Y	C01	NON	NON	NON	NON	C01	NON	NON	NON	C01	NON	C01	NON	NON	NON	C01	NON	C01	C01		C01	C01	NON	C01			NON	NON	C01	C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A								YES																						
01 X			MIS	MIS																										
01 Y	C01			NON	C01	C01	C01		NON	NON	C01	C01	NON	NON	NON	C01	C01	C04	C01	NON	C01	NON	NON	C04	NON	C01	NON	NON	C01	NON

QUESTION 104

THE FOLLOWING FORMAL REVIEWS WERE CONDUCTED AS A REQUIREMENT OF THE SOFTWARE DEVELOPMENT EFFORT. (AFR 300-15, 1978)

A. SYSTEMS REQUIREMENTS REVIEW
B. SYSTEMS DESIGN REVIEW
C. PRELIMINARY DESIGN REVIEW
D. CRITICAL DESIGN REVIEW
E. FORMAL QUALIFICATIONS REVIEW
Y. NO FORMAL REVIEWS WERE CONDUCTED
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES		YES	YES	YES	YES		YES				YES	YES			YES				YES	YES	YES	YES	YES		YES	YES		YES	YES
01 B	YES	YES	YES		YES	YES		YES	YES			YES	YES	YES		YES				YES	YES		YES	YES	YES	YES	YES		YES	
01 C	YES	YES	YES		YES	YES		YES		YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES
01 D	YES	YES	YES		YES	YES				YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES		
01 E	YES					YES						YES	YES			YES					YES	YES	YES	YES						YES
01 Y							NON								NON															
01 Z								OTH												OTH										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES		YES	YES	YES		YES		YES	YES	YES	YES						YES			YES	YES	YES	YES	YES	YES	YES	YES	YES
01 B		YES		YES	YES	YES	YES	YES			YES	YES	YES		YES			YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES
01 C	YES	YES	YES	YES	YES	YES	YES	YES	C03		YES		YES	YES			YES	YES	YES	YES		YES	YES	YES	YE.	YES	YES	YES		YES
01 D	YES	YES	YES	YES	YES	YES	YES	YES	C03	YES	YES		YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 E	YES	YES		YES	YES	YES	YES	YES			YES	YES		YES		C03	YES					YES		C04	YES		YES			
01 Z			OTH																											

QUESTION 105

CONCERNING REVIEWS

ACTION/FREQUENCY — 01 02 03 04 05 06

A. WAS FORMAL DOCUMENTATION PROVIDED IN ADVANCE OF EACH REVIEW?

B. DID REVIEWS TAKE PLACE ON SCHEDULE?

C. WERE THE REVIEW PROCEEDINGS FORMALLY DOCUMENTED?

D. DID TOP MANAGEMENT ATTEND FORMAL REVIEWS?

E. DID THE CUSTOMER/USER ATTEND FORMAL REVIEWS?:

F. WAS AN INDEPENDENT REVIEW TEAM USED (INDEPENDENT OF PROJECT MANAGER)?

G. DID THE PROJECT MANAGER ATTEND THE FORMAL REVIEWS?

H. WHAT WAS THE TITLE, POSITION AND AFFILIATION OF THE CHAIRPERSON OF THE FORMAL REVIEWS?

Y. THERE WERE NO FORMAL REVIEWS (ADDED)

01 = ALWAYS
02 = MOST OF THE TIME
03 = ABOUT 1/2 OF TIME
04 = LESS THAN 1/2 OF TIME
05 = SELDOM
06 = NEVER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	001	001	001	006	003	002		002	004	001	001	001	001	006		001	001	001	002	001	002	001	002	001	001	002	002	001	005	001
01 B	002	002	003	006	003	002		002	001	002	002	002		006		001	003	001	002	001	002	001	002	001	002	002	003	001	005	006
01 C	001	002	002	006	003	002		004	003	002	001	002	001	006		001	004	001	002	001	002	001	002	001	001	002	004	001	005	001
01 D	002	006	004	006	003	003		005	004	005	005	003	001	006		001	003	003	005	005	002	003	005	002	006	003	005	001	005	002
01 E	001	001	001	006		004		004	004	001	001	001	001	004		001	001	001	001	001	002	001	002	001	001	002	002	001	005	001
01 F	001	006	005	006		006		006	006	006	006	002	006	006		006	004	006	006		002		002	001	005	002	006	005	005	001
01 G	001	001	001	006	001	001		004	001	001	001	001	001	003		001	003	001	001		001		002	001	001	002	003	001	001	002
01 H	VAR	OCU	PTO	PMR	MEN	PMR	N/A	FTE	OCU	PMN	ENS	PMW	PMW	MIS	MIS	VPG	PMW	MPO	MPO	MIS	FSO	MIS	ENS	MIS	UNK	VAR	LSW	PMR	MCP	FTI
01 Y							C02								C01															

PART/SUB	RESPONDUR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	002	001	001	003	002	001	005	001	001	002	001	002	001		002	001	003	002	002	002	001	001	002	001	002	003	002	002	005	002
01 B	004	002	004	002	002	002	002	001	002	002	003	002	002	002	001	002	002	004	002	002	002	002	002	002	002	004	002	001	002	002
01 C	002	001	002	002	002	001	001	001	006	002	001	003	002	002	001	002	002	002	001	003	002	001	002	001	002	002	001	001	002	002
01 D	002	001	003	002	005	005	006	001	006	002	002	005	002	004	002	002	004	002	002	005	005	003	004	004	002	002	002	003	005	001
01 E	001	001	001	002	002	005	001	001	001	002	001	005	002	001	001	001	001	001	003	002	002	001	002	003	001	002	002	003	001	002	002
01 F	003	002	006	002	006	006	006	001	006	002	006	005	006	004	005	006	006	006	006	005	006	004	005	001	002	002	004	005	005	
01 G	001	002	001	002	002	001	001	001	002	002	001	006	002	001	001	001	001	001	001	006	001	002	002	001	002	001	002	001	002	001
01 H	OCU	PEN	MPD	PTD	MIS	ENS	OCU	VAR	PMW	MEN	FLS	MIS	MIS	PMW	PMR	MIS	MCP	MCP	MCP	PMR	PMR	OCU	PMR	ENS	VAR	PMR	VAR	PMR	PMW	MCP

QUESTION 106

WAS A SOFTWARE CONFIGURATION MANAGEMENT SYSTEM EMPLOYED?
A. YES - GIVE TITLE/NAME
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	C03	YES		SDM	C03					IHD	IHD	YES		IHD	YES	YES				MAN	IHD	YES	YES	YES	YES	CCS	YES		
01 B				YES			YES	YES	YES	YES				YES				YES	YES										YES	YES
01 X																				MIS										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			YES		YES	483	LIP	CUS	YES		YES			YES	YES	YES	483	IHD	SKD	CCS		HAC	IHD	IHD	IHD	YES			YES	
01 B	YES			YES						YES		YES	YES								YES						YES	YES		YES
01 X		MIS																												

QUESTION 107 THE SYSTEM WAS BASE LINED AFTER (AFR 800-15 1978)

A. SYSTEM REQUIREMENTS REVIEW
B. SYSTEM DESIGN REVIEW
C. PRELIMINARY DESIGN REVIEW
D. CRITICAL DESIGN REVIEW
Y. DID NOT BASE LINE SYSTEM (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A								YES										YES			YES		YES	YES						
01 B					YES							YES																		
01 C	YES		YES																				YES	YES			YES	YES		
01 D	YES	YES				YES							YES											YES	YES	YES		YES		
01 X																				MIS		MIS								
01 Y				NON			NON		NON	C02	C03			NON	C02	C02	NON		NON										C01	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A												YES							YES						YES	YES				
01 B			YES															YES	YES			YES			YES					
01 C		YES				YES	YES		YES		YES				YES		YES		YES			YES								
01 D			YES		YES			YES													YES	YES	YES		YES					
01 Y	NON			NON								NON	C02							NON				C02			NON	C01		
01 Z			OTH							OTH						OTH													OTH	OTH

QUESTION 108 WERE FORMAL CONFIGURATION CONTROL BOARDS EMPLOYED?

A. YES
B. NO
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES									YES	YES			YES	YES				YES		YES	YES	YES	YES	YES	YES		
01 B				YES	YES	YES	YES	YES	YES	YES	YES			YES	YES			YES	YES										YES	YES
01 X																				MIS		MIS								

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES		YES	YES		YES	YES		YES			YES				YES		YES		YES		YES	YES	YES			YES	
01 B	YES			YES			YES			YES		C01	YES		YES	YES	YES		YES		YES		YES				YES	C01		YES

QUESTION 109 GIVE TITLE, POSITION AND AFFILIATION OF CHAIRPERSON OF (SOFTWARE) CONFIGURATION CONTROL BOARD. (ADDED)

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MPD	DCU	MIS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	PMR	PMR	N/A	N/A	DCU	FSD	N/A	N/A	MIS	PMR	MIS	ENS	PMR	PMR	FSD	MPD	PMR	N/A	N/A

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	N/A	MPD	DCU	N/A	FSD	MIS	N/A	MIS	MEN	N/A	MPD	N/A	N/A	PEN	N/A	N/A	N/A	MEN	N/A	FSW	N/A	PMR	N/A	ENS	PMR	PMR	N/A	N/A	PME	N/A

QUESTION 110 HOW OFTEN WERE INFORMAL REVIEWS CONDUCTED BETWEEN THE PROJECT MANAGER AND HIS SUPERVISOR?

A. DAILY
B. WEEKLY
C. MONTHLY
D. AS REQUIRED
Y. THERE WERE NO INFORMAL REVIEWS
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A															YES	YES										YES				
01 B	YES			YES	YES		YES	YES	YES					YES							YES	YES		YES				YES	YES	YES
01 C											YES							YES		YES				YES	YES					
01 D		YES	YES			YES				YES		YES	YES				YES				YES		YES		YES		YES			
01 Y																			NON											

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A						YES										YES			YES								YES			
01 B	YES	YES							YES		YES		YES				YES	YES	YES		YES		YES	YES	YES			YES	YES	YES
01 D				YES			YES	YES	YES	YES	YES	YES		YES	YES					YES		YES		YES		YES				YES
01 X			MIS																											
01 Y					NON																									

QUESTION 111 WALK-THROUGHS (AS DEFINED BY WEINBERG 1971) WERE USED FOR:

A. DESIGN REVIEWS
B. CODING REVIEWS
Y. DID NOT USE WALK-THROUGHS
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES		YES		YES		YES			YES	YES	YES		YES	YES					YES			YES		YES	YES	YES		
01 B				YES	YES	YES		YES				YES			YES	YES				YES	YES					YES	YES	YES		
01 Y	NON		NON				NON		NON	NON				NON			NON	NON	NON			NON			NON				C01	NON
01 Z																						OTH								

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES	YES			YES		YES								YES	YES			YES	YES		YES		YES			YES
01 B	YES					YES			YES		YES	YES							YES			YES	YES				YES			YES
01 X			UNK																											
01 Y							NON						NON	NON	NON	NON	NON			NON	NON			NON		NON		NON	NON	

QUESTION 112 — HOW OFTEN WERE WALK-THROUGHS SCHEDULED?

A. DAILY
B. WEEKLY
C. MONTHLY
D. AS REQUIRED
Y. NOT USED
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A						YES					YES																			
01 B					YES																									
01 D		YES		YES				YES				YES	YES		YES	YES				YES	YES		YES	YES		YES	YES	YES		
01 Y	NON		NON				NON		NON	NON				NON			NON	NON	C01			NON			C01				C01	C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																						YES	YES							
01 B																		YES	YES										YES	YES
01 C				YES																										
01 D	YES	YES			YES	YES		YES		YES	YES	YES													YES		YES			YES
01 X			UNK																											
01 Y							C01							NON	NON	C01	C01	NON		NON	NON					NON		NON		
01 Z									OTH																					

QUESTION 113 — WHO NORMALLY ATTENDED WALK-THROUGHS?

	01 DESIGN	02 CODING	05 OTHER
A.	PEER PROGRAMMERS OR ANALYSTS		
B.	PROGRAMMER OR ANALYST TRAINEES		
C.	PROGRAMMER'S OR ANALYST'S SUPERVISOR		
D.	PROJECT MANAGER		
E.	STANDARDS MONITOR		
F.	TOP LEVEL MANAGER		
G.	USER/CUSTOMER		
H.	QUALITY ASSURANCE (ADDED)		
I.	LEAD/SYSTEM ENGINEER (ADDED)		
J.	TEST PERSONNEL (ADDED)		
Y.	DID NOT USE WALK-THROUGHS		
Z.	OTHER		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES	YES	YES		YES			YES		YES		YES						YES			YES		YES	YES	YES		
01 B						YES									YES						YES						YES			
01 C		YES			YES	YES					YES	YES	YES		YES						YES		YES					YES		
01 D					YES	YES		YES			YES		YES		YES						YES					YES	YES	YES		
01 E													YES								YES									
01 F					YES																YES									
01 G													YES								YES		YES			YES		YES		
01 H													C02																	
01 I																							YES							
01 J																							YES							
01 X																MIS														
01 Y	NON		NON				NON		NON	NON			C01			NON	C01	C01	C01			NON			C01				C01	C01
01 Z		OTH																					OTH							

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES		YES	YES			YES	YES	YES								YES	YES			YES	YES		YES		YES		YES	YES
01 B	YES	YES		YES	YES				YES													YES								YES
01 C	YES	YES		YES	YES			YES	YES	YES	YES											YES			YES		YES		YES	YES
01 D		YES		YES	YES			YES	YES									YES							YES		YES			
01 E				YES				YES																			YES			
01 F																											YES			
01 G		YES		YES	YES			YES		YES	YES														YES					YES
01 J																						YES								
01 X			UNK																											
01 Y						NON	C01					C01	NON	NON	NON	C01	C01			NON	NON			C01		NON		NON		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A				YES	YES	YES					YES		YES		YES					YES	YES			YES		YES	YES	YES		
02 B						YES									YES												YES			
02 C		YES									YES	YES	YES		YES								YES					YES		
02 D					YES						YES		YES													YES		YES		
02 E													YES														YES			
02 G													YES										YES			YES				
02 H													YES																	
02 I																							YES							
02 X																MIS														
02 Y	NON		NON				NON	NON	NON	NON				C02			NON	C01	C01			NON			NON				C01	C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A	YES			YES		YES		YES	YES		YES								YES				YES		YES		YES		YES	YES
02 B	YES			YES								YES						YES				YES			YES		YES		YES	YES
02 C	YES			YES				YES														YES					YES		YES	YES
02 E				YES																										
02 J																						C02								
02 X			UNK																											
02 Y		NON			NON		C01			C01			NON	NON	NON	C01	C01			NON	NON			NON		NON		NON		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A				YES	YES	YES																		YES						
03 B						YES																								
03 C																							YES						
03 D					YES																									
03 F																											YES			
03 G																							YES							
03 I																							YES							
03 X		MIS														MIS														
03 Y	NON		NON				NON	NON	NON	NON	NON	NON	NON	C02	NON		NON	C01	C01	NON	C01	NON			NON	NON		NON	C01	C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A																														YES
03 B																														YES
03 C																														YES
03 D																														YES
03 G																														YES
03 X			UNK																											
03 Y	C01	NON		NON	NON	NON	C01	NON	NON	C01	NON	NON	NON	NON	NON	C01	C01	C01	C01	NON	NON	C01	C01	NON	NON	NON	C01	NON	C01	

QUESTION 114 WERE WALK-THROUGH MINUTES/RECORDS KEPT?

A. YES
B. NO
Y. WALK-THROUGHS NOT USED
Z. OTHER

	01 DESIGN	02 CODING	03 OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES	YES	YES		YES			YES												YES	YES		YES	YES	YES		
01 B		YES										YES	YES	YES	YES							YES					YES			
01 X																MIS														
01 Y	NON		NON				NON		NON	NON									NON	C01	C01	NON		NON				C01	C01	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES		YES	YES			YES	YES	C03	YES												YES							
01 B	YES											YES							YES											
01 X			UNK			MIS																								
01 Y							C01						NON	NON	NON	C01	C01			NON	NON			NON		NON		NON		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A				YES							YES												YES			YES				
02 B		YES						YES				YES	YES	YES	YES						YES	YES						YES		
02 X																MIS														
02 Y	NON		NON		NON	NON	NON		NON	NON							NON	C01	C01		NON		NON	NON			NON	C01	C01	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A				YES				YES	YES	C03												YES					YES			YES
02 B	YES											YES						YES	YES				YES						YES	
02 X			UNK			MIS																								
02 Y		NON			NON		C01				NON		NON	NON	NON	C01	C01			NON	NON			NON	NON	NON		NON		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A				YES																			YES							
03 B								YES						YES																
03 X		MIS														MIS														
03 Y	NON		NON		NON	NON	NON		NON	NON		NON	NON		NON		NON	C01	C01	NON	C01	NON		NON	NON	NON	NON	NON	C01	C01
03 Z											OTH																			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A																														YES
03 B												YES						YES												
03 X			UNK			MIS																								
03 Y	C01	NON		NON	NON		C01	C01	NON	C01	NON		NON	NON	NON	C01	C01		C01	NON	NON	C01	C01	NON	NON	NON	C01	NON	C01	

QUESTION 115 IF IT WERE WITHIN YOUR POWER TO MAKE ANY CHANGES IN THE METHOD OR PROCEDURES FOLLOWED IN CONTROLLING THIS PROJECT WHAT WOULD THESE CHANGES BE, OR, IF YOU HAD RESOURCES AVAILABLE TO UNDERTAKE RESEARCH IN THE AREA OF PLANNING WHICH ASPECT WOULD YOU EXPLORE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	X7H	MIS	CTE	CMB	C1F	MIS	CWC	CVB	MIS	MIS	MIS	MIS	P8E	MIS	C1F	P1A	P1A	N/A	CMD	MIS	MIS	MIS	NON	XRF	MIS	MIS	C1B	C1B
01 002			CWC							CVB	O6D					PBH		CVC												X1E
01 003																		CWC												CMB

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	MIS	MIS	NON	MIS	MIS	CMB	MIS	MIS	C11	PRB	MIS	CWC	MIS	CME	O4D	CWC	CVA	MIS	MIS	C1K	CRE	CSG	CMD	MIS	CRB	MIS	C1C	CRF	CMG
01 002							P5I								CMF						CMF		CSJ	R1O		CRC				

QUESTION 116

ENTER THE NUMBER OF POSITIONS (BY CATEGORY DESCRIBED) DIRECTLY INVOLVED IN THIS DEVELOPMENT PROJECT

A. FULL TIME, REPORT TO PROJECT MANAGER
B. FULL TIME, REPORT OUTSIDE PROJECT MANAGER'S ORGN
C. FULL TIME, OUTSIDE CONTRACTOR/CONSULTANT
D. FULL TIME, CUSTOMER
E. PART TIME, REPORT TO PROJECT MANAGER
F. PART TIME, REPORT OUTSIDE PROJECT MANAGER'S ORGN
G. PART TIME, OUTSIDE CONTRACTOR/CONSULTANT
H. PART TIME, CUSTOMER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	040	034		012	015	002	004	020	017		015	001	055	005			040	002	006	005		003	008	040	004				100	004
01 B		000		005		020	002		060				030							035		063	120	210						000
01 C		000		000			002	001	020				250							014			035		004					000
01 D		000		000			002	015												000										
01 E		000		000																000						YES	003			004
01 F		000		000		008	003													000			004				003			001
01 G																							006							000
01 H							001																							
01 X			MIS							MIS					MIS	MIS					MIS							MIS		

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	024			039	010		006	008	004		004		010	006	010	020	012		015	008	002	001	001	030	012	015	030	005	045	070
01 B					003		006				002					003			001							025	005	003		020
01 C								008			001													005	001	004		000		002
01 D	0011																													
01 E											001				005		005			002									010	015
01 F											002								001		002					008			005	
01 G											001																			
01 H	005																													
01 X		MIS	MIS			MIS				UNK		MIS						UNK												

QUESTION 117

THE PROJECT MANAGER WAS RESPONSIBLE FOR
A. TECHNICAL QUALITY
B. HIRE AND FIRE ASSIGNED PERSONNEL (WITHIN FIRM POLICY)
C. EVALUATE PERFORMANCE OF INDIVIDUAL PERSONNEL
D. ADMINISTRATION, BUDGET, ETC.
E. ALLOCATING COMPUTER RESOURCES
F. ALLOCATING NON-COMPUTER RESOURCES
G. MEETING SCHEDULE COMMITMENTS
H. NEGOTIATING SPECIFICATION CHANGES WITH CUSTOMER
I. MAKING A PROFIT (I.E., OPERATING WITHIN A BUDGET)
Y. NONE OF THE ABOVE (ADDED)
Z. OTHER

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 B	YES	YES	YES		YES								YES						YES		YES			YES		YES			YES	
01 C	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES		YES		YES		YES		YES	YES	YES	YES			YES	YES
01 D	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES				YES			YES		YES	YES	YES		YES	YES	YES	YES	
01 E	YES		YES	YES	YES	YES		YES	YES	YES	YES		YES				YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
01 F	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES				YES		YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	
01 G	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 H	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	
01 I		YES	YES			YES	YES		YES										YES	YES		YES	YES	YES				YES	YES	YES
01 X																MIS														
01 Z			OTH																											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES
01 B	YES			YES				YES	YES		YES						YES			YES	YES		YES	YES	YES		YES	YES	YES	
01 C	YES		YES	YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES
01 D	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES					YES	YES	YES		YES		YES	YES	YES	YES		YES	YES	YES	
01 E	YES			YES	YES	YES	YES	YES	YES		YES				YES	YES	YES		YES	YES		YES	YES	YES			YES	YES	YES	
01 F	YES			YES	YES	YES	YES	YES	YES		YES				YES	YES			YES	YES		YES	YES	YES			YES	YES		
01 G	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 H	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES		YES	YES		YES		YES	YES	YES	YES	YES	YES	YES		YES
01 I	YES		YES	YES			YES	YES	YES	YES	YES				YES	YES	YES										YES	YES	YES	
01 X		MIS																												

QUESTION 118 THE TITLE AND POSITION OF THE PROJECT MANAGER'S SUPERVISOR WAS

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MPD	MEN	MEN	MCP	MEN	MEN	MPA	MCP	MPA	MEN	MCP	PEN	VPE	MEN	MPD	MIS	MPD	MPD	MEN	MIS	MEN	MIS	MPD	MCP	MEN	MIS	MCP	MPD	VPG	MPD

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MCP	MIS	MPD	VPG	MEN	MCP	MEN	PMW	MPD	VPG	MEN	MEN	PEN	PEN	PEN	PEN	MCP	MGR	FEN	MEN	MCP	PMR	MGR	FEN	FLS	FSA	MPA	MEN	MPD	MCP

QUESTION 119 THE SPAN OF CONTROL OF THE PROJECT MANAGER'S SUPERVISOR (INCLUDING THE PROJECT MANAGER) WAS**********PERSONS.

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	004	004	004	002	040	400	004	060	090	020	140	004	999	MIS	060	MIS	100	006	007	MIS	006	010	010	250	025	004	021	006	100	060

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	400	MIS	005	013	030	060	100	060	080	004	450	003	035	060	030	050	007	100	035	003	024	255	015	100	125	MIS	075	140	150	300

QUESTION 120

THE TITLE, POSITION, AND NUMBER OF PEOPLE REPORTING DIRECTLY TO THE PROJECT MANAGER WAS

	01 TITLE	02 POSITION	03 NUMBER
A.			
B.			
C.			
D.			
E.			
F.			
G.	PROJECT MANAGER'S SPAN OF CONTROL IS ---- PERSONS.		
Y.	NONE/UNKNOWN (ADDED)		

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	FSE	FTE	PTD	CAN	LPA	ENS	LPA	CAN	LPA	ENJ	LSE	ECH	ESW		EAN		CDV	LSA	FLS		PMA		PMA		OMA	ESW	LSW		PMR	CPA
01 B	FSA	FLS	FLS	CPR	SMG	EHW	CPA	CAN		ENG	ENG	EHW	CDV		EAN		CPA	CPR	ENG		FLS		SEC		OMA	EHW	LSW		PMA	CPA
01 C	FTI			SEC	SEC	ESW		CPA		LSE	ENJ	CAN	COP				CMS	ENG	CPR		SEC				OMA	CAN	CPR		SAS	
01 D				SLI	CPR			CAN			SLI		CDV				ESW										SLI			
01 E								CPR									SAD										CAN			
01 X														MIS		MIS				MIS		MIS		MIS				MIS		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	LSP			PTD	CPA		ENG	ESW	FSR	PMA	FSY	CAN	CPA	CPJ	FTC	CAN	FSY	FSA	LSE		WMT	FLS	SEC	CPA	FLS	CPR	FAP	FAP	PMA	CPR
01 B	PMC			FTC				ENG	FSA		FAP			CPR	CPR	CPR	FSW	ENT	SPC			LPA	CPR				EAN	FSA	FSD	CAN
01 C	FLS							CAN	FSA		FVS			ESW		EIG	FTM	ENS			WMT	STS					CDA	FEN	FSE	CPA
01 D	LPA							ENT	FSU		FPC			ESW		SOP	LSA				SLI	PMR						FSS	FOS	
01 E								EIG						ESW																
01 F								SEC																						
01 X			MIS	MIS																										
01 Y						C01														C01										

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PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A	FLS							CHP					FLS		EAN										CPA					G12
02 B	FLS							CAN					FLS		EAN										SAD					G11
02 C	FLS							CPA					FLS												STS					
02 D								CAN					FLS																	
02 E								CPH																						
02 X														MIS		MIS				MIS		MIS		MIS				MIS		
02 Y		C01	C01	C01	C01	C01	C01		C01	C01	C01	C01					C01	C01	C01		C01		C01		NON	C01		C01		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A								FLS	FLS									FLS									FAP			
02 B								FLS	FLS									FLS					WMT				EAN			
02 C								FLS	FLS									FLS					WMT				CDA			
02 D								FLS	FLS														WMT							
02 E								FLS																						
02 F								SEC																						
02 X		MIS	MIS																											
02 Y	C01			C01	C01	C01	C01		NON	C01	C01	C01	C01	C01	C01	C01		C01	C01	C01	C01		C01	C01	NON		C01	C01	C01	

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A	001	001	001	003	005	005	001	003	002	004	004	001	020		005		001	001	002		001		008		001	002	001		006	004
03 B	002	001	004	007	001	022	003	001		006	007	001	035		002		001	002	002		006		004		001	001	002		002	005
03 C	001			001	001	003		001		002	003	001	030				001	002	002		001				001	001	003		004	
03 D				001	012			004			001		010				001										001			
03 E								007									001										001			
03 G	004	002	005	012	020	030	004	020	117	012	015	003	095	MIS	008	MIS	005	005	006	MIS	006	MIS	012	MIS	004	004	008	003	012	016

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A	001			001	010		025	001	006	001	001	010	010	001	003	006	001	015	004		003	003	000	020	003	015	001	001		
03 B	001			007				001	011		001			001	008	002	001	015	001			008	003				002	001		
03 C	006							001	010		001			001		004	001	010				003	003				002	001		
03 D	010							001	008		001			001		003	001					041	001					001		
03 E								001						002																
03 F								001																						
03 G	024	MIS	010	008	010	020	025	006	035	005	350	010	010	006	011	020	004	050	015	010	004	055	015	020	012	015	035	032	050	100
03 Y						C01																								

QUESTION 121

INDICATE THE REVIEWS THE PROJECT MANAGER ATTENDED AND THE CAPACITY IN WHICH HE ATTENDED

	01 REVIEWER	02 REVIEWEE	03 OBSERV
A. FORMAL (MANAGEMENT) REVIEWS (ADDED)			
B. WALK-THROUGHS			
C. BUDGET REVIEWS (ADDED)			
D. TECHNICAL REVIEWS (ADDED)			
Y. THERE WERE NO REVIEWS (ADDED)			
Z. OTHER			

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES	YES	YES	YES	YES			YES		YES				YES	YES	YES		YES	YES	C02	YES	YES		YES	YES	YES	
01 B					YES	YES					YES				YES											YES	YES	YES		
01 C	YES			YES		YES		YES				YES	YES				YES	YES	YES		YES	YES		YES				YES	YES	
01 X														MIS		MIS				MIS										
01 Y		C01	C01						C01	C01															C01					C01

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	C02		YES		YES			YES				YES	YES	YES	YES		YES	YES					YES	YES		YES		YES	YES	YES
01 B					YES			YES	YES																					YES
01 C	YES								YES	YES					YES			YES				YES		YES		YES		YES		
01 D																								C02						
01 X		MIS									MIS																			
01 Y				C01		C01	C01									NON			C01	C01	C01				C01		C01			

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A			YES		YES			YES	YES	YES		YES			YES		YES						C02			YES			YES	
02 B															YES															
02 C	YES	YES	YES		YES	YES		YES	YES	YES	YES				YES		YES									YES			YES	YES
02 X														MIS		MIS				MIS										
02 Y				NON			NON						C01					C01	C01		C01	NON		C01			C01	C01		

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A	C02			YES		YES	YES			YES				YES		YES			YES		YES	YES			YES	YES	YES	YES		
02 B	YES			YES																										
02 C	YES			YES	YES	YES	YES			YES							YES						YES	YES	YES	YES	YES	YES	YES	YES
02 D																								C02						
02 X		MIS									MIS																			
02 Y			C01					C01	NON			C01	C01		C01			C01		C01										

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
03 A		YES				YES									YES								YES	YES				YES	YES	YES
03 B		YES						YES													YES		YES					YES		
03 C																													YES	
03 X														MIS		MIS				MIS										
03 Y	C01		C01	C01	C01		NON		C01	C01	C01	C01	C01				C01	C01	C01			NON			C01	NON	C01			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
03 A			YES																	YES						YES				
03 B	YES					YES		YES		YES								YES	YES				YES				YES			
03 C																			YES											
03 D	C02																													
03 X		MIS									MIS																			
03 Y				C01	C01		C01		C01			C01	C01	C01	C01	NON	C01				C01	C01		C01	C01				C01	C01	C01

QUESTION 122

THE PROJECT MANAGER WAS EXPECTED (BY CORPORATE MGMT) TO BE (ADDED)
A. A TECHNICAL SUPERVISOR
B. A NON-TECHNICAL SUPERVISOR
C. PROJECT ADMINISTRATOR (ONLY) (ADDED)
Y. NONE OF THE ABOVE (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES		YES	YES		YES	YES	YES	YES	YES	YES	YES	YES	YES			YES	YES				YES	YES	YES	YES		YES	YES	YES
01 B	YES	YES	YES	YES													YES				YES	YES	YES		YES		YES			YES
01 C		YES		YES		YES	YES	YES					YES						YES				YES	YES			YES	YES	YES	YES
01 X																MIS				MIS										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					YES	YES	YES	C03	YES	C03		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES		YES	YES	
01 B				YES			YES									YES														
01 C			YES		YES		YES	C03					YES	YES	YES	YES					YES	C01	YES		YES		YES			YES
01 X	MIS	MIS									MIS																			

QUESTION 12. IN THE CONDUCT OF THIS PROJECT DID THE COMPANY OR PROJECT MANAGER MAKE A CONSCIOUS EFFORT TO APPLY ANY OF THE FOLLOWING MANAGEMENT TECHNIQUES?

	01 COMPANY	02 PROJ MGR
A.	MANAGEMENT BY OBJECTIVES (DRUCKER 1954)	
B.	JOB ENRICHMENT (HERZBERG 1977)	
C.	(MOTIVATION) THEORIES (MASLOW 1943) (CORR)	
D.	SUGGESTION PROGRAM	
E.	INCENTIVE AND/OR BONUS PROGRAM	
F.	PARTICIPATIVE MANAGEMENT	
G.	MANAGEMENT BY EXCEPTION	
Y.	NONE OF THE ABOVE (ADDED)	
Z.	OTHERS	

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES			YES	YES	YES	YES	YES			YES		C01				YES		YES			YES	YES				YES		YES
01 B																				YES										
01 D				YES									YES											YES						YES
01 E																							YES							
01 F																				YES				YES						YES
01 G	YES		YES					YES							YES													YES		
01 X										MIS						MIS					MIS								MIS	
01 Y											C01						C01		NON						C01	NON	NON			
01 Z																						OTH								

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES			YES	YES								YES	YES						YES				YES		
01 B									YES																				YES	
01 D	YES								YES	YES					YES							YES						YES	YES	
01 E									YES																YES		YES	YES		
01 F					YES																							YES		
01 G																		YES	YES			YES	YES							
01 X		MIS	UNK				MIS				MIS										MIS									
01 Y						C01						C01	C01	C01		C01				C01					C01				C01	

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
02 A		YES		YES	YES			YES	YES			YES	YES	YES				YES	YES					YES			YES	YES		YES
02 B												YES	YES		YES												YES	YES		
02 D				YES									YES		YES									YES						YES
02 F																	YES							YES	YES	YES		YES		YES
02 G	YES		YES					YES	YES			YES					YES											YES		
02 X										MIS						MIS					MIS								MIS	
02 Y						C01	C01				C01									C01		NON	C01							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
02 A	YES			YES	YES	YES			YES			YES					YES			YES			YES	YES	YES		YES	YES	YES	
02 B									YES																		YES		YES	
02 D																									YES		YES	YES		
02 E																												YES		
02 F					YES											YES						YES	YES	YES	YES	YES	YES	YES	YES	
02 G	YES																					YES							YES	
02 X		MIS	UNK				MIS				MIS										MIS									
02 Y								C01		C01			C01	C01	C01			C01	C01											C01

QUESTION 124

IN USING MANAGEMENT BY OBJECTIVES THE OBJECTIVES WERE:
A. SET BY THE PROJECT MANAGER WITHOUT INPUT FROM THE TEAM MEMBER
B. SET BY THE PROJECT MANAGER WITH INPUT FROM THE TEAM MEMBER
C. PERIODICALLY REVIEWED
Y. DID NOT USE MANAGEMENT BY OBJECTIVES
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES																								YES		
01 B		YES			YES	YES	YES	YES	YES			YES	YES	YES				YES	YES					YES		YES	YES	YES		YES
01 C		YES			YES			YES	YES			YES	YES											YES		YES		YES		YES
01 X										MIS					MIS					MIS										
01 Y	NON		NON								NON				NON		NON				NON	NON	NON		C01				C01	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A												YES																	YES	
01 B	YES		YES	YES	YES		YES	YES	YES								YES	YES		YES			YES	YES	YES		YES	YES		
01 C	YES							YES									YES	YES									YES	YES		
01 X		MIS	UNK				MIS				MIS										MIS									
01 Y													NON	NON	NON	NON			NON			NON				C01				NON

QUESTION 125

THE PROJECT MANAGER:

A. ISSUED INSTRUCTIONS TO HIS SUBORDINATES IN WRITING
B. DELEGATED TECHNICAL DECISIONS TO HIS DIRECT SUBORDINATES (TEAM CHIEFS)
C. HAD AN OPEN DOOR POLICY
D. EMPLOYED QUALITY STANDARDS DEFINING WHAT WAS EXPECTED OF EACH PROGRAMMER/ANALYST
E. EMPLOYED QUANTITY STANDARDS DEFINING HOW MUCH EACH PROGRAMMER/ANALYST SHOULD ACCOMPLISH
F. MONITORED PROGRESS WITH THE AID OF A CONTROL BOARD AND/OR CONTROL ROOM
G. HAD A SEPARATE OFFICE TO INSURE PRIVACY
H. HAD A PERSONAL SECRETARY

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES	YES	YES	YES						YES					YES			YES		YES	YES				YES	YES	
01 B	YES	YES	YES		YES			YES	YES			YES	YES		YES		YES		YES		YES		YES	YES			YES	YES		YES
01 C	YES	YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	YES		YES		YES		YES		YES	YES	YES	YES	YES	YES	YES	YES
01 D					YES						YES									YES	YES			YES			YES	YES	YES	
01 E				YES				YES		YES	YES																		YES	
01 F	YES	YES	YES		YES			YES					YES				YES				YES		YES	YES	YES					
01 G	YES	YES	YES	YES	YES	YES	YES		YES		YES		YES				YES		YES	YES	YES	YES	YES	YES		YES		YES	YES	YES
01 H	YES		YES	YES	YES	YES					YES		YES				YES		YES	YES	YES	YES	YES	YES		YES			YES	YES
01 X																MIS														

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A								YES	YES			YES			YES			YES		YES				YES				YES	YES	YES
01 B	YES			YES		YES		YES	YES				YES	YES		YES	YES	YES		YES		YES		YES	YES	YES	YES	YES	YES	YES
01 C	YES			YES	YES	YES	YES	YES	YES		YES				YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES	YES
01 D					YES			YES	YES					YES		YES	YES			YES			YES		YES					
01 E								YES						YES			YES	YES					YES		YES					
01 F	YES			YES		YES			YES	YES	YES				YES							YES					YES		YES	YES
01 G	YES			YES			YES	YES	YES							YES	YES	YES			YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
01 H				YES			YES	YES	YES		YES						YES					YES	YES						YES	YES
01 X		MIS	UNK																											

QUESTION 126 HOW DID THE UNION CONTRACT AFFECT THE RESPONSIBILITY AND AUTHORITY OF THE PROJECT MANAGER?

A. LIMITED HIS ABILITY TO HIRE AND FIRE HIS STAFF
B. REQUIRED CLEARANCE FROM THE UNION PRIOR TO TAKING CERTAIN MANAGEMENT ACTIONS
C. UNION HELPED MOTIVATE TEAM PERSONNEL TOWARD BETTER PERFORMANCE
D. UNION LABOR STANDARDS ENHANCED THE PROJECT MANAGERS AUTHORITY
E. UNION LABOR STANDARDS RETARDED THE PROJECT MANAGERS AUTHORITY
F. UNION LABOR STANDARDS ENHANCED PRODUCTION
G. UNION LABOR STANDARDS RETARDED PRODUCTION
H. UNION MEMBERSHIP HAD NO RECOGNIZABLE AFFECT ON THE PROJECT
Y. NO TEAM MEMBERS WERE REPRESENTED BY A UNION
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				YES														YES												
01 B				YES																										
01 H				YES	YES			YES									YES					YES							YES
01 X																MIS														
01 Y	NON	NON	NON		NON	NON	NON		NON	NON	NON	NON	NON	NON	NON				NON	NON	NON		NON	NON	NON	NON	NON	NON	NON	

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 H						YES			YES	YES									YES				YES							YES
01 X		MIS	UNK									MIS																		
01 Y	NON			NON	NON		NON	NON			NON		NON	NON	NON	NON	NON	NON		NON	NON	NON		NON	NON	NON	NON	NON	NON	

QUESTION 127 IF YOU HAD IT WITHIN YOUR POWER TO IMPLEMENT CHANGES IN THE WAY THIS PROJECT WAS DIRECTED, OR HAD THE RESOURCES TO DEVOTE TO RESEARCH IN THIS AREA, WHAT ACTION WOULD YOU TAKE?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	D1B	MIS	P5E	MIS	01D	MIS	MIS	MIS	MIS	MIS	MIS	MIS	MIS	MIS	DRB	S1G	MIS	MIS	MIS	MIS	MIS	MIS	MIS	NON	MIS	MIS	MIS	S5A
01 002			D1C				03D																							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	MIS	MIS	NON	MIS	MIS	MIS	MIS	MIS	NON	NON	MIS	D1A	MIS	MIS	05A	03D	MIS	MIS	MIS	MIS	MIS	03D	PRC	MIS	P5A	MIS	05D	MIS	MIS
01 002																05F												05H		

QUESTION 128

THIS PROJECT IS
A. 50% COMPLETE OR LESS
B. 51% TO 75% COMPLETE
C. 76% TO 90% COMPLETE
D. 91% TO 98% COMPLETE
E. 99% TO 99.99% COMPLETE
F. 100% COMPLETE AND ACCEPTED BY CUSTOMER
Y. CANCELLED/NOT DELIVERABLE (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B				YES								YES	YES																	
01 C									YES		YES																	YES		
01 D			YES		YES	YES	YES																YES			YES				
01 E																					YES									
01 F	YES	YES							YES			YES	YES	YES	YES	YES	YES	C01			YES	YES		YES	YES			YES	YES	
01 Y								C04																						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES		YES				YES																						
01 C																									YES	YES				
01 D			YES											YES	YES				YES											
01 E							YES													YES		YES								
01 F					YES	YES			YES	YES			YES			YES	YES	YES					YES	YES	YES			YES	YES	YES
01 X											MIS	MIS																		
01 Y		C02																												

QUESTION 129 WAS THE PROJECT COMPLETED ON OR BEFORE SCHEDULE?

A. YES, ON SCHEDULE
B. YES,----------MONTHS EARLY,----------% EARLY
C. NO,----------MONTHS LATE,----------% LATE
D. YES, HOWEVER SPECIFICATIONS WERE REDUCED (ADDED)
Y. PROJECT NOT COMPLETED AND/OR NO ESTIMATE AVAILABLE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES		YES	YES	YES						YES	YES		YES	YES		YES	YES			YES		YES				YES	YES	
01 C1			N/S				006	008	003	012	006			015			006			001	017		006		024	004	001			001
01 C2			030				040	035	010	100	030			100			050			004	047		025		100	016	015			006
01 D			C02																											
01 Y								C02																						
01 Z															OTH															

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES	YES	YES	YES	YES			YES	C04	YES	YES	YES	YES					YES								
01 C1		006	006							003								006	006	003	003		010	003	004	006	002	002	001	003
01 C2		011	015							010								025	025	012	030		045	007	025	010	008	011	003	018
01 X											MIS																			
01 Y	C02																													

QUESTION 130 IF NOT COMPLETED ON TIME WHAT WAS THE MAJOR CAUSE OF SLIPPAGE (/CANCELLATION) (ADDED)

A. CHANGE IN REQUIREMENT
B. CHANGE IN METHOD OF DESIGN
C. BAD INITIAL ESTIMATE
D. UNREASONABLE ESTIMATE, BY EITHER TOP MANAGEMENT OR THE CUSTOMER
E. LIMITED AUTHORITY OVER RESOURCES
F. EXCESSIVE ABSENCES ON THE PART OF THE PROJECT TEAM MEMBERS
G. POOR MANAGEMENT (ADDED)
Y. PROJECT WAS COMPLETED OR IS ON SCHEDULE (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			YES	YES				YES	YES	YES		YES								YES	YES		YES		YES	YES	YES			
01 B				YES		C03															YES									
01 C				YES						YES											YES		YES		YES					
01 D			YES								YES		YES			YES					YES		YES		YES	C03				
01 E			YES					YES	YES																		C03			
01 F								YES																						
01 G																											C03			C02
01 Y	C01	C01			C01	C01							C01		C01	C01		C01	C01			C01		C01					C01	C01
01 Z								OTH									OTH													

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES									YES		YES						YES	YES					YES		YES		YES	YES	YES
01 B																							YES							
01 C	YES	YES	YES										YES							YES				YES	YES		C03			
01 D			YES															YES						YES					YES	
01 E																				YES	YES			YES			C03	YES	YES	
01 G	YES																				C02					C02				
01 X											MIS																			
01 Y				C01	C01	C01	C01	NON	C01				C02	C01	C01	C01						C01									
01 Z			OTH																											OTH

QUESTION 132 IF PROJECT WAS LATE, WHAT PORTION (IN PERCENT) IS ATTRIBUTABLE TO CHANGE IN REQUIREMENTS? **********%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	N/A	N/A	MIS	MIS	N/A	N/A	000	080	080	050	015	095	N/A	050	100	N/A	015	N/A	N/A	090	020	N/A	015	N/A	050	000	090	N/A	N/A	000

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	070	020	002	050	N/A	N/A	N/A	N/A	N/A	010	MIS	030	000	N/A	N/A	N/A	N/A	040	060	000	005	N/A	075	003	010	075	001	007	080	005

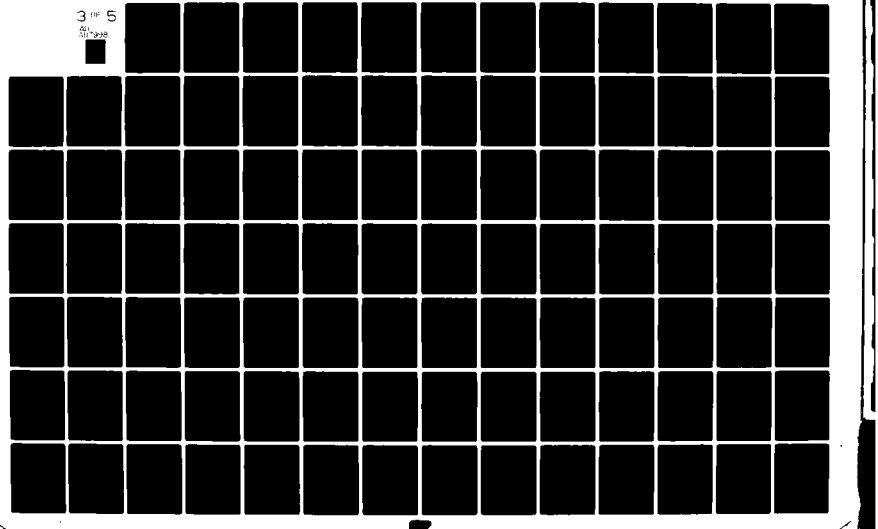
QUESTION 135 WHAT, IF ANYTHING, COULD THE PROJECT MANAGER HAVE DONE TO IMPROVE HIS ABILITY TO MEET THE SCHEDULE? (ORIGINALLY NARRATIVE)

A. RESTRICT THE NUMBER OF CHANGES
B. REQUIRE FORMAL SYSTEM OF CHANGES
C. REQUIRE A FIRM REQUIREMENTS BASELINE
D. CONDUCT MORE REVIEWS
E. RECEIVE MORE AUTHORITY OVER PROJECT
F. MADE A BETTER ESTIMATE OF SCHEDULE
G. PERFORM BETTER PLANNING
H. NOTHING
I. BETTER DIRECTION AND CONTROL
J. BETTER AND EARLIER REQUIREMENT SPECIFICATIONS
Y. PROJECT WAS COMPLETED OR IS ON SCHEDULE
Z. OTHER

	RESPONDON																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																									C02					
01 B			C02																				C02							
01 C							C02			C02	C02																			
01 D																											C02			
01 E								C02																						
01 F													C02										C02			YES				
01 G																C02														
01 H											C02																		C02	
01 I																C02				C02										
01 J																											C02			
01 X								MIS											MIS											
01 Y	C01	C01		C01	C01	C01							C01		C01	C01		C01	C01		C01			C01		C01			C01	C01
01 Z																											C02			

PANT/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	C02														C02			C02										YES	C02	
01 B															C02															
01 C	C02			C02																				C02						C02
01 E									C02															C02				YES		
01 F	C02		C02																											
01 G			C02						C02				C02						C02		C02		C02	C02						
01 H										C02																				
01 I		C02																						C02	C02	C02	C02			
01 J		C02																C02					C02						C02	
01 X											MIS	MIS		N/A							MIS									
01 Y					C01	C01	C01	NON								C01	C01					C01									
01 Z	C02																													

AD-A117 998 SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/G 22/2
RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U)
DEC 79 R H THAYER, J H LEHMAN
UNCLASSIFIED SM-ALC/MME-TR-79-54-VOL-2 NL



QUESTION 134 — WAS THE PROJECT DELIVERED WITHIN THE ORIGINAL BUDGET?

A. YES, ON COST
B. YES, $++++++++++++UNDER COST, ++++++++++% UNDER COST
C. NO, $++++++++++++OVER COST, ++++++++++% OVER COST
D. YES, HOWEVER SPECIFICATIONS WERE REDUCED (ADDED)
Y. PROJECT NOT COMPLETED AND/OR NO ESTIMATE AVAILABLE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES			YES	YES	YES			YES							YES		YES	YES									YES	YES	
01 B1													N/S											505						
01 B2													010											N/S						
01 C1		N/S	YES				N/S	YES		N/S	204	N/S		404	233		505			N/S	N/S	N/S	405		504	163	N/S			103
01 C2		100	YES				070	YES		050	060	015		050	006		008			010	050	011	022		170	010	015			065

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES	YES	YES					YES		YES	YES	YES						YES								
01 C1		N/S							N/S	N/S			YES				154	YES	504	N/S			N/S	154	YES	YES	134	YES	N/S	YES
01 C2		015							025	010			YES				003	YES	075	010			096	010	YES	YES	006	YES	007	YES
01 X											MIS										MIS									
01 Y	C01	NON						NON																						

QUESTION 135 IF NOT COMPLETED WITHIN THE ORIGINAL BUDGET, WHAT WAS THE CAUSE OF THIS SLIPPAGE (CANCELLATION)? (ADDED)

A. CHANGE IN REQUIREMENTS
B. CHANGE IN METHOD OF DESIGN
C. BAD INITIAL ESTIMATE
D. UNREASONABLE ESTIMATE, BY EITHER THE MANAGER OR THE CUSTOMER
E. LIMITED AUTHORITY OVER RESOURCES
F. EXCESSIVE ABSENCES ON THE PART OF THE PROJECT TEAM MEMBERS
G. POOR MANAGEMENT (ADDED)
Y. PROJECT WAS COMPLETED OR IS WITHIN COST (ADDED)
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES	YES	YES				YES	YES	YES					YES					YES	YES	YLS	YES		YES		YES			
01 B				YES			C03														YES									
01 C				YES						YES		YES		YES			YES				YES		YES		YES					
01 D			YES								YES										YES		YES		YES					
01 E								YES																			C03			
01 F								YES																						
01 G																	C02										C03			C02
01 X																										MIS				
01 Y	C01				C01	C01							C01			C01			C01	C01				C01				C01	C01	
01 Z								OTH																						

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES								YES	YES		YES						YES	YES					YES		YES		YES	YES	YES
01 B												YES											YES							
01 C	YES		YES						YES									YES		YES				YES	YES	YES	C03		YES	
01 D													YES											YES						
01 E																				YES				YES				YES	YES	
01 G	C02																													
01 X											MIS										MIS									
01 Y		NON		C01	C01	C01	C01	NON						C02	C01	C01						C01								
01 Z																	OTH													

QUESTION 136 IF PROJECT EXCEEDED COST ESTIMATES, WHAT PORTION OF THE OVERRUN (IN PERCENT) WAS CAUSED BY A CHANGE IN REQUIREMENTS? ++++++++++%

PART/SUB	RESPONDON 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	N/A	100	050	100	N/A	N/A	000	075	100	MIS	010	N/A	N/A	050	100	N/A	005	N/A	N/A	090	020	100	010	N/A	050	MIS	090	N/A	N/A	000

PART/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	070	N/A	002	N/A	N/A	N/A	N/A	N/A	005	010	MIS	033	020	000	N/A	N/A	000	090	100	N/A	MIS	N/A	075	005	010	075	N/A	008	080	005

QUESTION 137

WHAT, IF ANYTHING, COULD THE PROGRAM MANAGER HAVE DONE TO IMPROVE MIS ABILITY TO MEET THE BUDGET? (ORIGINALLY NARRATIVE)

A. RESTRICT THE NUMBER OF CHANGES
B. REQUIRE FORMAL SYSTEM OF CHANGES
C. REQUIRE A FIRM REQUIREMENTS BASELINE
D. CONDUCT MORE REVIEWS
E. RECEIVE MORE AUTHORITY OVER PROJECT
F. MADE A BETTER ESTIMATE OF COSTS
G. PERFORM BETTER PLANNING
H. NOTHING
I. BETTER DIRECTION AND CONTROL
J. BETTER AND EARLIER REQUIREMENT SPECIFICATIONS
Y. PROJECT WAS COMPLETED OR IS WITHIN COST
Z. OTHER

	RESPONDOR																												
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			C02																						C02					
01 B			C02																											
01 C							C02			C02	C02																			
01 E																	C02													
01 F							C02										C02						C02				C02			
01 G							C02			C02	C02																			
01 H																					C02								C02	
01 I																	C02													
01 J							C02				C02																			
01 X		MIS						MIS				MIS			MIS	MIS	MIS					MIS	MIS				MIS			
01 Y	C01			C01	C01	C01			C01			C01			C01			C01		C01	C01			C01				C01	C01	
01 Z																											C02			

PANT/SUB	RESPONDON 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	C02																									C02			C02	
01 C	C02															C02								C02		C02				C02
01 D																						C02								
01 E																	C02		C02					C02			C02	C02		
01 F	C02		C02						C02																					
01 G											C02								C02									C02		
01 H										C02																				
01 I																								C02				C02		
01 J													C02			C02		YES								C02			C02	
01 X																				MIS	MIS				MIS					
01 Y		NON		C01	C01	C01	C01	NON				C01		C01	C01							C01								
01 Z	C02																													

QUESTION 130 DID THE DELIVERED SOFTWARE MEET THE REQUIREMENTS AS ORIGINALLY SPECIFIED BY THE CUSTOMER?

A. YES
B. NO
Y. NO REQUIREMENTS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES		YES	YES	YES			YES	YES	YES	YES	YES	YES	YES	COS	YES	YES	YES	YES		YES	YES	YES		YES	YES	YES	YES	YES
01 B			YES																		YES				YES					
01 Y							NON	NON																						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES	YES	YES		YES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES	YES	YES	YES	
01 B			YES																						YES					YES
01 K		MIS																												
01 Y	C02							NON		NON																				

QUESTION 139

DID THE CUSTOMER ACCEPT THE DELIVERED SYSTEM AS MEETING SPECIFIED REQUIREMENTS IN TOTAL, OR DID HE IDENTIFY EXCEPTIONS?

A. ACCEPTED SYSTEM IN TOTAL AS MEETING SPECIFIED REQUIREMENTS
B. IDENTIFIED EXCEPTIONS
Y. NO REQUIREMENTS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES	YES			C03	YES			YES		YES	YES	YES	YES	YES	YES		YES	YES			YES	YES	YES		YES	YES	YES	YES	YES
01 B			YES							YES							YES			YES	YES				YES					
01 Y				NON			NON	C01																						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES	YES	YES	YES		YES	YES		YES		YES	YES	YES	YES	YES	YES		YES	YES	YES	YES		YES		YES	YES	
01 B			YES								YES		YES							YES					YES		YES			YES
01 Y	C02	NON						NON																						

QUESTION 140 HOW WAS IT DETERMINED THAT THE SYSTEM MET THE REQUIREMENTS SPECIFIED?
(ORIGINALLY NARRATIVE)
A. QUALIFICATION/FIELD TEST
B. SYSTEM IN OPERATION
C. FORMAL SYSTEM/ACCEPTANCE TEST
D. INDEPENDENT VERIFICATION AND VALIDATION
E. CHECK AGAINST KNOWN ANSWERS
F. SIMULATION
G. SYSTEM DID NOT MEET REQUIREMENTS SPECIFIED
Y. NO REQUIREMENTS SPECIFIED AND/OR PROJECT NOT COMPLETED
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	C02	C02				C02				C02		C02	C02	C02	C02	C02	C02			C02		C02			C02	C02	C02	C02	C02	C02
01 B									C02						C02															
01 C					C02						C02								C02		C02		C02	C02						
01 D																				C02	C02									
01 E																			C02											
01 F										C02		C02																		
01 G			YES																											
01 Y				C02			NON	C01																						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		C02		C02					C02		C02		C02				C02		C02			C02	C02			C02				C02
01 B												C02			C02															
01 C			C02			C02	C02		C02	C02				C02	C02						C02			C02			C02	C02	C02	
01 D									C02					C02																
01 E					C02													C02		C02										
01 G																									C02					
01 Y	C01							NON																						

QUESTION 141 — WHY DID THE SYSTEM NOT MEET THE REQUIRED SPECIFICATION? (ORIGINALLY NARRATIVE)

A. REQUIREMENTS CHANGED
B. INITIAL ESTIMATE BAD
C. REQUIREMENTS IGNORED/CUSTOMER ACCEPTED WITHOUT CORRECTION (ADDED)
D. SYSTEM MET REQUIREMENTS SPECIFIED
Y. NO REQUIREMENTS SPECIFIED AND/OR PROJECT NOT COMPLETED
Z. COMMENT

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			C02							C02						C03							C03							
01 B			C02																						C02					
01 D	YES	C01			C01	YES			YES		YES	C01	YES	C01	YES		YES	C01	YES	C01		C01		YES		C01	C01	C01	C01	C01
01 X																					MIS									
01 Y				C02			NON	C01																						

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			C02																											C02
01 B																									C02					
01 C			C02													C02														
01 D				C02	C01	YES	C01		YES	YES	YES	YES		YES	YES		YES	YES	YES	YES	C01	YES	YES	YES		YES	YES	YES	YES	
01 Y	C01	NON						NON																						
01 Z													OTH																	

QUESTION 142 DID THE DELIVERED SOFTWARE MEET THE RELIABILITY STANDARDS ORIGINALLY SPECIFIED?

A. YES
B. NO
Y. NO STANDARDS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES							YES	YES					YES			YES			YES	YES					
01 B														YES																
01 Y	NON	NON	NON	NON		NON	NON	NON	NON	NON	NON				NON	NON	NON		NON	C01		NON	NON			NON	NON	NON	NON	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A			C03		YES	YES	YES				YES							YES	YES				YES	YES			YES			
01 B																									YES	YES				
01 X									MIS																					
01 Y	NON	NON		NON				NON		NON		NON	NON	NON	NON	NON	NON			NON	NON	NON				NON		NON	NON	NON

QUESTION 143 WHY DID THE DELIVERED SOFTWARE FAIL TO MEET THE RELIABILITY STANDARDS?

A. REQUIREMENTS CHANGED (ADDED)
B. NOT ENOUGH REVIEWS AND TESTING (ADDED)
C.
D. SYSTEM MET THE SPECIFIED RELIABILITY STANDARDS
Y. NO STANDARDS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 D					C01							C01	YES					C01			C01			C01	C01					
01 Y	NON	C01	NON	NON		NON	NON	NON	NON	NON	NON				NON	NON	C01	NON		C01	C01		NON	NON			NON	NON	C01	C01	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																										C02				
01 B																										C02				
01 D		YES	C01		C01	YES	C01				YES							C01	YES				C01	YES	YES		YES			
01 X									MIS																					
01 Y	NON			NON				NON		NON		C01	NON	NON	NON	NON	NON			NON	C01	C01						NON	NON	NON

QUESTION 144

WHICH, IF ANY, OF THE FOLLOWING METHODS OF MEASURING RELIABILITY OF THE DELIVERED SOFTWARE SYSTEM WERE USED IN THE PROJECT? (GILB 1977)

A. THE FINISHED SYSTEM WAS SALTED WITH KNOWN BUGS (AFTER INTEGRATION TESTING AND BEFORE SIGN OFF). THE SYSTEM WAS THEN DEBUGGED FOR A FIXED (GIVEN) PERIOD OF TIME AFTER WHICH THE RATIO OF FOUND KNOWN BUGS TO FOUND UNKNOWN BUGS WAS JUDGED EQUAL TO THE RATIO OF UNFOUND KNOWN BUGS TO UNFOUND UNKNOWN BUGS.
B. CURVES OF ERRORS FOUND TO TIME SPENT DEBUGGING WERE CALCULATED
C. A SOFTWARE RELIABILITY ERROR PREDICTION MODEL WAS EMPLOYED
D. SPECIAL TEST DRIVERS WERE EMPLOYED TO STRESS SYSTEM (ADDED)
E. REPORTED ERRORS PER UNIT OF TIME (MTBF) AND SYSTEM ACCEPTED WHEN ERROR RATE REACHED ACCEPTABLE LEVEL (ADDED)
Y. NO RELIABILITY MEASURING METHOD WAS EMPLOYED (AND/OR PROJECT NOT COMPLETED) (ADDED);
Z. OTHER

	RESPONDOR																												
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B													YES		YES									YES						
01 E		C02																												
01 X																		MIS							MIS					
01 Y	NON		NON	NON		NON	NON	NON	NON	NON	NON	NON		NON		C03	NON		NON	NON	NON	NON	NON			NON	NON	C01	C01	NON
01 Z					OTH																									

	RESPONDOR																												
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					C03													YES								YES				
01 B						YES			YES													YES			YES					
01 C										YES			YES																	
01 D	C02						C02																							
01 E															C02	C02							YES	YES			C02			
01 X			MIS																											
01 Y		NON		NON				NON		NON	NON					NON			NON	NON				NON				NON	NON	
01 Z																	OTH													

QUESTION 145

DID THE DELIVERED SOFTWARE MEET THE MAINTAINABILITY STANDARDS ORIGINALLY SPECIFIED?

A. YES
B. NO
Y. NO STANDARDS SPECIFIED AND/OR PROJECT NOT COMPLETED (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A		YES			YES									YES								YES				YES				
01 X																												MIS		
01 Y	C02		C02	C01		C02	C02	C02	C01	C02	C02	C02		C01	C02	C01	C02	NON	C02	C01		C01	C02	C02		NON	C01		C02	C02

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES	YES		YES		YES				YES							YES	YES					YES	YES		YES	YES	YES	
01 Y	C02			C03		C03		NON	C02	C02		C02	C02	C02	C02	C02	C02			C03	C02	C01	C02			C01				C02

QUESTION 146 WHY DID THE DELIVERED SOFTWARE FAIL TO MEET THE MAINTAINABILITY STANDARDS?

A.
B.
C.
D. SOFTWARE MET THE SPECIFIED MAINTAINABILITY STANDARDS
Y. NO STANDARDS SPECIFIED (AND/OR PROJECT NOT COMPLETED) (ADDED)
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 D		C01			C01								YES								YES				C01					
01 X																		MIS										MIS		
01 Y	NON		NON	C02		NON	NON	NON	NON	NON	NON	C01		NON	NON	NON	NON		NON	NON		NON	NON	C01		NON	NON		C01	NON

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 D		C01	YES		C01		C01				C01							C01	YES					YES	YES		YES	YES	YES	
01 Y	NON			NON		NON		NON	NON	NON		NON	C01	NON	NON	NON	NON			NON	NON	NON	C01			NON				NON

QUESTION 147

WHICH IF ANY OF THE FOLLOWING METHODS OF MEASURING THE MAINTAINABILITY OF THE DELIVERED SOFTWARE WERE USED IN THE PROJECT? (GILB 1977)

A. MEASURED THE TIME TO REPAIR THE FIRST N NUMBER OF BUGS REPORTED (AFTER INTEGRATION TESTING AND JUST BEFORE SIGN OFF) THE AVERAGE TIME TO FIND A BUG BECAME THE MEAN TIME TO REPAIR (MTTR).

B. SALTED THE FINISHED CODE WITH KNOWN BUGS. THE AVERAGE TIME TO FIND AND REPAIR THE KNOWN BUGS BECAME THE MEAN TIME REPAIR (MTTR).

C. COST TO MAINTAIN PROGRAM PER UNIT OF TIME AND ACCEPTED WHEN COST REACHED AN ACCEPTABLE LEVEL (ADDED)

Y. NO MAINTAINABILITY MEASURES WERE EMPLOYED AND/OR PROJECT NOT COMPLETED (ADDED)

Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A													YES																	
01 X		MIS			MIS													MIS							MIS			MIS		
01 Y	C01		C01	C02		C01	C02	C02	C01	C02	C02	C02		C01	C01	C01	C02		C01	C02	C01	C01	C02	C01		NON	C01		C01	NON
01 Z													OTH																	

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A											YES							YES									YES		YES	
01 C																								C02						
01 X			MIS		MIS		MIS																		MIS					
01 Y	C02	C01		C02		C01		NON	C01	C01		C01	C02	C02	C03	C03	C03			C01	C01	C01	C01			C02				C01
01 Z																		OTH										OTH	OTH	

QUESTION 148 WAS THE DELIVERED SYSTEM USABLE? IF SO, HOW WAS THIS DETERMINATION MADE? (ORIGINALLY NARRATIVE)

A. YES, SYSTEM IS IN PRODUCTION
B. YES, SYSTEM IS IN USE
C. YES, INDEPENDENT VERIFICATION AND VALIDATION
D. YES, FIELD OR QUALIFICATION TESTING
E. YES, CUSTOMER WAS SATISFIED
F. UNKNOWN, HAS NOT BEEN DETERMINED
G. NO, USER WAS NOT SATISFIED
Y. NO, THE SYSTEM WAS NOT DELIVERED/CANCELLED
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A									C02																					
01 B	C02				C02				C02			C02			C02		C02			YES		C02	C02						C02		
01 C																				YES		C02								
01 D			C02		C02		C02				C02			C02			C02		C02	C02								C02		
01 F				C02																	C02									
01 G																								C02					C02	
01 X														MIS										MIS		MIS	MIS			
01 Y							C02	C02			C02																			

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 B				C02	C02						C02		C02		C02						C02				C02	C02	C02		C02	
01 D		C02		C02		C02		C02	C02	C02		C02		C02		C02		C02	C02	C02			C02					C02		C02	
01 E																C02								C02						
01 F																	C02													
01 X			UNK																			MIS								
01 Y	C02							NON																						

QUESTION 149 WHAT WAS THE PERIOD OF THE FINAL PRODUCT WARRANTY?

A. 1 YEAR
B. 2 YEARS
C. 3-5 YEARS
D. 6 OR MORE YEARS
Y. NO WARRANTY
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A					YES	YES										YES														YES
01 X																										MIS				
01 Y	NON	NON	NON	NON			NON	NON	NON	NON	NON	NON	NON	NON	NON		NON	NON	NON		NON	NON	NON	NON	NON		NON	NON	NON	
01 Z																				OTH										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A										YES					YES						YES	YES							YES	
01 B																	YES	YES												
01 C																												YES		
01 D																									YES					
01 X			MIS									MIS																		
01 Y	NON	NON		NON	NON	NON	NON	NON	NON		NON		NON	NON		NON			NON	NON				NON	NON		NON	NON		NON

QUESTION 150

WHAT WAS THE APPROXIMATE PRODUCTION RATE (LINES OF CODE PER DAY) FOR THE ENTIRE PROJECT?
A. AVERAGE PROGRAMMER/ANALYST
B. BEST PROGRAMMER/ANALYST
C. WORST PROGRAMMER/ANALYST
Z. COMMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	003	006		010	010	003	020	020	060	004	011	003	004		011		001	030	040		013	015		004	025	007	010			
01 B					015			040	100			001										020		012		007	015			013
01 C					006			005	020			005										008					005			
01 X			UNK											MIS		N/A				MIS			UNK					MIS	UNK	

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	020		016		068	015	015		003	004	005		004	004	003	004	015	015	016	012		015	010	010	030	015		020	015	004
01 B	100		024		088						008		006	006	007	006	012	020	050			UNK	UNK	020	060	030		035	025	006
01 C	005		008		028						004		002	002	001	002	010	010	NEG			UNK	UNK	005	010	005		005	003	
01 X		MIS		UNK				UNK				DIS									MIS						UNK			

QUESTION 151 HOW MANY LINES OF CODE WERE PRODUCED PER PAGE OF DOCUMENTATION?

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	010	MIS	UNK	025	008	200	010	020	028	MIS	008	UNK	MIS	010	N/A	100	030	030	MIS	UNK	MIS	UNK	MIS	MIS	MIS	250	005	UNK	UNK

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	100	MIS	UNK	UNK	MIS	015	015	MIS	010	058	UNK	MIS	021	025	010	100	025	008	200	MIS	MIS	027	001	030	150	025	MIS	UNK	MIS	UNK

QUESTION 152 WHAT WAS THE COST PER LINE OF CODE? $**********

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	079	019	015	008	010	050	008	020	005	040	018	100	160	025	020	MIS	040	100	006	MIS	UNK	075	UNK	100	010	060	050	MIS	UNK	006

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	011	MIS	013	UNK	022	016	015	MIS	100	050	050	DIS	050	050	070	050	027	030	030	030	MIS	006	017	012	010	010	052	UNK	009	009

QUESTION 153 WAS SOFTWARE DEVELOPMENT THE PACING FACTOR (CRITICAL PATH) ON THE PROJECT?

A. YES, HARDWARE WAS DEVELOPED AHEAD OF SOFTWARE
B. NO, SOFTWARE WAS DEVELOPED AHEAD OF HARDWARE
C. YES, PROJECT WAS ALMOST ALL SOFTWARE
D. NO, HARDWARE AND SOFTWARE DELIVERED TOGETHER (ADDED)
E. VARIED HARDWARE AND SOFTWARE ALTERNATED (ADDED)
Y. PROJECT NOT COMPLETED/THERE WAS NO PACING FACTOR (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			YES								YES	YES		YES			YES				YES			YES	YES			YES		
01 B									YES							YES		YES											C05	
01 C				YES	YES			YES	YES																					
01 D	C02					C02							C02		C02											YES					
01 E		C02								C02																		C02		
01 X																				MIS										

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A				YES					YES		YES					YES							YES			YES	YES	YES		
01 B			YES			YES	YES	YES						YES				YES	YES	YES		YES	YES							
01 C	YES												YES		YES	YES				YES				YES	YES				YES	YES
01 D										C02				C02																
01 X			MIS																											

QUESTION 154

WHAT PERCENT OF PRODUCTION (CALENDAR TIME) WAS SPENT IN THE FOLLOWING AREAS? (ADDED)

A. REQUIREMENT SPECIFICATION ++++++++++%
B. PRELIMINARY DESIGN ++++++++++%
C. DETAIL DESIGN ++++++++++%
D. PROGRAMMING/UNIT TESTING ++++++++++%
E. INTEGRATION TESTING ++++++++++%
F. SYSTEM TESTING ++++++++++%
Y. PROJECT NOT COMPLETE (ADDED) ----------%
Z. COMMENT ----------%

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	010			005	020	015	008	030	015	005	010	025	025	010	010	019	010	005				010	015	010		015	010			006
01 B	010	020	010	010	020	015	011	010	010	005	010	010	015	010	020	019	010	010				010	010	015		015	010			003
01 C	020	020		045	020	020	017	020	015	015	010	020	020	030	030	010	020	025				020	015	020		030	010			008
01 D	020	010	025	030	015	020	040	035	025	050	040	015	015	030	010	010	010	040				020	010	015		020	020			029
01 E	030	030	035	005	015	010	015	005	020	010	020	010	015	020	015	016	040	010				040	040	010		010	020			006
01 F	010	020	010	005	010	020	009	000	015	010	010	020	020	020	015	016	010	010					010	030		010	020			048
01 X																				MIS	UNK				MIS			MIS	UNK	
01 Y																			NON											

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	015		010	010	012	030		015	020	010	020		010	005	010	000	017	010	010		005	013	005	020	010	020		010	020	
01 B	010		010	010	008	010	020	015	015	005	010		010	005	010	010	007	010	020	020	010	014	006	010	015	010		020	010	
01 C	025		030	040	005	020	020	010	010	015	020		060	020	010	020	019	010	025	020	015	015	017	015	035	020		020	010	
01 D	050		020	020	040	010	020	020	015	010	020		010	020	025	010	035	010	030	020	030	016	007	030	040	025		010	020	
01 E			020	010	015	025	020	020	020	030	020		005	010	025	010	007	030	010	020	030	020	028	015	010	020		020	030	
01 F			010	010	020	005	020	020	020	030	010		005	040	020	050	015	030	005	020	010	022		010	010	005		020	010	040
01 X		MIS										MIS															MIS			

QUESTION 155

IF THE PROJECT USED ON-LINE, INTERACTIVE PROGRAMMING FOR PROGRAM DEVELOPMENT, WAS IT
A. A HIGHLY EFFECTIVE DEVELOPMENT TOOL
B. EFFECTIVE IN SOME CASES
C. OF LIMITED UTILITY
D. A DRAIN ON HARDWARE RESOURCES
E. A NICE TOY
Y. ON-LINE, INTERACTIVE PROGRAM WAS NOT USED/UNKNOWN
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A									YES			YES	YES					YES							YES		YES			
01 B				YES	YES		YES														YES								YES	
01 E				YES																										
01 X		MIS												MIS		MIS			MIS				MIS					MIS	MIS	
01 Y	NON		NON			NON		NON		NON	NON				NON		NON		NON			NON	NON			NON				

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A											YES		YES	YES		YES					YES			YES		YES	YES			YES
01 B			YES			YES												YES	YES	YES										
01 C												YES																		
01 D				YES																										YES
01 X		MIS					MIS	MIS																						
01 Y	NON				NON				NON	COS					NON		NON					NON	NON		NON			COS	NON	

QUESTION 156

IF YOUR EXPERIENCE REFLECTS THAT ON-LINE, INTERACTIVE PROGRAMMING WAS AN EFFECTIVE TOOL, IN WHICH SITUATION WAS IT MOST EFFECTIVE? (CHECK OR RANK ORDER)

A. DURING DEVELOPMENT OF CODE
B. TO TRY SHORT LENGTH OF CODE FOR POSSIBLE USE (SIMULATION APPROACH)
C. DURING DEBUGGING
D. DURING TESTING
E. NOT AN EFFECTIVE TOOL
Y. DID NOT USE ON-LINE, INTERACTIVE PROGRAMMING/UNKNOWN
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A				004			YES		004			YES	YES														YES			
01 B					YES				002									YES												
01 C				003			YES	YES	001			YES	YES								YES				YES					YES
01 D				002				YES	003																					YES
01 E				001																										
01 X		MIS												MIS		MIS				MIS				MIS				MIS	MIS	
01 Y	NON		NON			NON				NON	NON				NON		NON		NON			NON	NON			NON			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	001		YES											YES				001	YES		YES	YES				YES	YES			YES
01 B	002					YES					YES			YES				002												
01 C	003			YES									YES	YES		YES		003		YES	YES			YES		YES	YES			YES
01 D	004												YES	YES		YES		004						YES			YES			YES
01 X		MIS					MIS	MIS				MIS																		
01 Y					C01				C01	NON					NON		NON						NON		NON			C01	NON	

QUESTION 157

IF YOUR EXPERIENCE REFLECTS THAT ON-LINE, INTERACTIVE PROGRAMMING WAS AN EFFECTIVE TOOL WHAT DO YOU FEEL THE IMPROVEMENT IN PROGRAMMER PRODUCTIVITY OVER CONVENTIONAL (BATCH) SOFTWARE DEVELOPMENT WAS?

A. NOT AN IMPROVEMENT
B. 1.5:1 IMPROVEMENT
C. 2:1 IMPROVEMENT
D. 3:1 IMPROVEMENT
E. 5:1 IMPROVEMENT
Y. DID NOT USE ON-LINE, INTERACTIVE PROGRAMMING/UNKNOWN
Z. OTHER

RESPONDOR PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 B					YES		YES											YES			YES									
01 C												YES	YES														YES		YES	
01 D								YES	YES																					
01 E																				YES										
01 X		MIS												MIS		MIS				MIS				MIS				MIS	MIS	
01 Y	NON		NON	NON		NON				NUN	NON				NON		NON		NON			NON	NON		NUN				

RESPONDOR PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																				YES										
01 B												C03							YES		YES						YES			
01 C																		YES		YES		YES		YES					YES	
01 D	YES		YES								YES																			
01 E													YES																	
01 X		MIS	MIS			MIS	MIS	MIS																						
01 Y					C01				C01	NON				NON	NON		NON						NON		NON			C01	NON	
01 Z																OTH														

QUESTION 158

OVERALL, HOW WELL DO YOU THINK THAT THIS PROJECT MET THE PROJECT MANAGERS MAJOR GOALS: TO DELIVER ON TIME, WITHIN BUDGET, AND MEETING THE REQUIREMENT OF THE SYSTEM, WHERE THE FINAL SOFTWARE PRODUCT IS RELIABLE, MAINTAINABLE, AND USABLE?

A. EXTREMELY WELL
B. VERY WELL
C. GOOD
D. FAIR
E. POOR
F. FAILED
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	YES								YES					YES		YES				YES		YES		YES				YES		
01 B		YES			YES	YES						YES	YES					YES	YES							YES			YES	
01 C				YES						YES					YES						YES						YES			
01 D									YES																					YES
01 E							YES																		YES					
01 F			YES					YES									YES													
01 X																							MIS							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A					YES		YES					YES		YES	YES	YES						YES								
01 B				YES		YES			YES		YES		YES				YES	YES	YES										YES	YES
01 C			YES							YES											YES				YES		YES			
01 D																				YES				YES						
01 E																										YES		YES		
01 F	YES																						YES							
01 X		MIS						MIS																						

QUESTION 159 GIVE SOME LESSONS LEARNED FROM THIS PROJECT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	MIS	MIS	P5C	MIS	R1G	MIS	O1C	R10	R10	04A	MIS	MIS	MIS	MIS	S5B	P1A	R1D	MIS	P9G	M1S	R9C	S5B	P3E	066	P3F	R3C	MIS	S1A
01 002					P5D		R1J		O1C	X1E	X1E	04B					P1A		R1E						CMH		X9D	06B		X1E
01 003					STM		P8B		D5C								P1B		R1G									R7F		CMA
01 004							P8D										P1C											CMA		CMA
01 005							P1E										C1A													P9J
01 006																														D1A

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	P9H	MIS	P1C	MIS	07E	D9A	MIS	MIS	CSF	P1E	R1D	MIS	CWA	05E	MIS	P9E	C1E	P5C	MIS	MIS	MIS	C1E	R9B	D3B	MIS	CSF	MIS	C1H	R1Y	R1A
01 002	P91		P1D		07F	D9B			X9G	CKG	P5C						05E	P9F				C1J		C1D		CSC		P8B	CWC	CMA
01 003			X1E						X1E	R9D	P5D							X9K				CSF		C1E		01B		CWA	P3C	CMG
01 004			P8I						CMA		P3G							CWC				CSG						S2D	X1E	C1A
01 005									P1A									R1B				D5D						D3E		P9K
01 006									C1D													D3F						D6J		S1D
01 007									C1F													P5D						S2A		
01 008									P3B																			D5A		
01 009									X7B																			C1C		
01 010									X9H																			D5B		
01 011																												P3C		

QUESTION 160

PLACE THE FOLLOWING OBJECTIVES OF A PROJECT MANAGER IN ORDER OF IMPORTANCE (ENTER NUMBER 1 THROUGH 6 IN THE SPACE PROVIDED) THE PROJECT SHOULD

A. BE WITHIN BUDGET
B. BE ON SCHEDULE
C. MEET REQUIREMENTS
D. BE MAINTAINABLE
E. BE RELIABLE
F. BE USABLE
G. DEPENDS ON CONTRACT INCENTIVE (ADDED)
H. VARIES WITH JOB (ADDED)

	RESPONDOR																											
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A	006	005	001	006	006	003	003	006	003	006	006	002	005	002			003	002	001	003	001	001		002	005	005	006	003	006	006
01 B	005	003	004	005	005	005	004	004	002	005	005	003	004	003			002	003	004	004	001	002		002	003	004	005	002	005	005
01 C	002	002	002	001	004	001	001	001	001	002	002	001	001	001			001	004	002	005	001	003		001	001	002	001	001	001	002
01 D	004	006	005	002	003	006	006	005	006	004	004	006	006	006			006	006	MIS	006	002	006		005	006	006	004	005	004	004
01 E	003	004	006	003	002	004	005	003	005	003	003	005	003	005			005	005	MIS	002	002	005		005	004	003	002	006	003	003
01 F	001	001	003	004	001	002	002	002	004	001	001	004	002	004			004	001	003	001	002	004		005	002	001	003	004	002	001
01 G																						C02								
01 H															C02															
01 X															MIS															

	RESPONDOR																											
PART/SUB	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	002	003	002	002	006	006	005	004		003	002	004	004	006	003	004	003	003	003	003	006	004	003	004	005	002	005	003	004	003
01 B	003	001	001	003	005	004	004	004		002	003	005	003	005	002	003	004	004	002	002	004	003	004	005	004	001	006	002	001	002
01 C	001	002	003	005	003	001	002	001		001	001	001	001	002	004	002	001	001	001	001	003	002	002	003	001	003	001	001	002	001
01 D	006	006	005	006	004	005	006	004		006	006	006	005	004	006	MIS	006	006	006	005	005	006	006	006	006	006	004	005	006	005
01 E	005	005	006	001	002	003	001	002		005	005	003	006	003	005	MIS	002	002	004	006	002	005	005	002	003	004	003	006	005	006
01 F	004	004	004	004	001	002	003	003		004	004	002	002	001	001	MIS	005	005	005	004	001	001	001	001	002	005	002	004	002	004
01 X									MIS																					

QUESTION 161

IT IS REPORTED IN LITERATURE THAT: 1 SUPPORT LIBRARIAN, PLUS 2 PROGRAMMERS CAN DO THE WORK OF 5 PROGRAMMERS. DO YOU BELIEVE THIS?

A. YES
B. NO
C. DO NOT KNOW, INSUFFICIENT DATA/EXPERIENCE (ADDED)
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A			YES	YES				YES		YES	YES		YES	YES							YES		C05		YES						
01 B	YES	YES			YES	YES	YES		YES			C05				C05	YES	YES	YES	YES		YES				YES			YES	YES	YES
01 C																											C02			
01 X															MIS									MIS						

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A	YES	YES			YES	C03	YES				YES			YES					YES	YES		YES		YES	YES	YES	YES				
01 B			YES	YES						C03		YES	YES		YES			YES					YES					YES		
01 C								C02									C02				C02										
01 X									MIS							MIS													MIS	MIS

QUESTION 162

IF YOU BELIEVE THE SUPPORT LIBRARIAN DOES BELIEVE THE PROGRAMMER/ANALYST OF UNNECESSARY TASKS, BUT DO NOT BELIEVE THE RATIO IS 2 TO 1, WHAT RATIO DO YOU CONSIDER MORE ACCURATE?

A. 1 TO 1
B. 3 TO 1
C. 4 TO 1
D. 5 TO 1
E. 10 TO 1
F. VARIES, ACCORDING TO SKILL LEVEL (ADDED)
G. DO NOT BELIEVE/DO NOT KNOW (ADDED)
Y. BELIEVE 2 TO 1
Z. OTHER

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A														YES																
01 B			YES										YES				YES	YES												
01 C					YES	YES																				YES				
01 D	YES			YES				YES																						
01 E		C02																												
01 F			C02												C02								C02				C03			
01 G											YES								C02							C03				
01 X															MIS							MIS					MIS			
01 Y						C01		C01	C01												C01			C01				C01		
01 Z																				OTH		OTH								

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A																									YES					
01 B																											YES			
01 C			YES																							YES				
01 D					YES	YES			YES					YES		YES		YES												
01 F												C02																		
01 G			C02				C03								C02				C02											
01 X								MIS			MIS			MIS									MIS						MIS	MIS
01 Y	NON	C01				C01			C01				C01						C01	C01		C01		C01		C01				

QUESTION 163 WHAT ACTIONS ARE CUSTOMARILY TAKEN BY THE PROJECT MANAGER WHEN IT IS DISCOVERED THAT A PROJECT IS BEHIND SCHEDULE?

A. WRING HANDS
B. ASSIGN MORE PERSONNEL TO THE PROJECT
C. RENEGOTIATE SCHEDULE WITH CUSTOMER
D. RENEGOTIATE SCHEDULE WITH MANAGER
E. QUIT
F. SAY NOTHING TO TOP MANAGEMENT HOPING TO MAKE UP SCHEDULE TIME
G. REDUCE PROJECTS GOALS (ADDED)
H. REALIGN MANPOWER (ADDED)
I. USE OVERTIME (ADDED)
J. REPLAN THE PROJECT (ADDED)
K. VARIES, DEPENDS ON SITUATION (ADDED)
Y. NOTHING (ADDED)
Z. OTHER

	RESPONDOR																										
PART/SUB	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 A																								YES						
01 B		YES				YES	YES			YES	YES		YES	YES			YES	YES			YES	YES		YES	YES	YES		YES		003
01 C				YES		YES		C02						YES					YES	YES	YES	YES		YES		YES	YES	C03	YES	002
01 D				YES		YES											YES							YES		YES	YES		C05	001
01 F							YES																							
01 G							C02																							
01 H								YES																						
01 I					C02																	C02					C02			
01 J			C02					C02				C02					C02			C02										
01 K		C02										C02			C02								C02							
01 X																MIS														
01 Z																											OTH			

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 A		YES						YES																	001					
01 B	YES	YES			YES		YES	C03		YES	YES				YES		YES		YES	YES	YES	YES		YES	004				YES	YES
01 C							YES	C03		YES	YES			YES			YES		YES		YES			YES	002				YES	YES
01 D										YES	YES		YES	YES				YES	YES				YES	YES	003				YES	YES
01 E																									005					
01 F			YES			YES						YES																		
01 G																										C02				
01 I								C02								C02											C02	C02		
01 J																						C02						C02		C02
01 K				C02				C02																						
01 X									MIS																					

QUESTION 164 PLEASE FURNISH ANY ADDITIONAL COMMENTS OR STATEMENTS CONCERNING THIS SURVEY OR THE SCIENCE OF SOFTWARE ENGINEERING PROJECT MANAGEMENT

PART/SUB	RESPONDOR 101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
01 001	MIS	MIS	A01	MIS	MIS	A03	A07	MIS	A12	MIS	MIS	A16	MIS	MIS	MIS	MIS	A18	MIS	MIS	MIS	A22	MIS	MIS	MIS	A15	MIS	MIS		MIS	MIS
01 002			A02			A04	A08		A13			A17					A19													
01 003						A05	A09		A14								A20													
01 004						A06	A10		A15								A21													
01 005							A11																							

PART/SUB	RESPONDOR 201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230
01 001	MIS	A23	A20	A25	A26	MIS	MIS	MIS	MIS	MIS	MIS	MIS	MIS	MIS	MIS	A27	MIS	MIS	MIS	MIS	MIS	MIS	MIS	A25	MIS	MIS	MIS	MIS	MIS	MIS
01 002			A24																											

SECTION 3
REFERENCE

INTRODUCTION

In preparing this survey, literally hundreds of books, articles, and papers were read. The results of this literature search became a general model of how software engineering project management was accomplished. This model is represented by the original questionnaire (see Appendix B). It would be impractical in an informal report such as this to list all these publications, particularly since many of the ideas contributed were general across many different publications. However, where one document was the source of most of one question (or a group of questions) or a unique definition was used (i.e., structural programming, HIPO, chief programmer, Orthodox Job Enrichment, etc.) a reference is given. We hope nobody was slighted.

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APPENDIX A

CONTRIBUTORS

INTRODUCTION

This appendix lists those individuals (usually project managers) and firms who completed the survey. This list is provided to: 1) acknowledge the contribution, hard work and willingness to contribute to the general knowledge of computer science by these individuals; and 2) to lend credibility to this report by making visible the excellent source of the data.

These people and companies are all members and supporters of the AIAA Technical Committee on Computer Systems.

At the end of this list is a group of individuals that wished to remain anonymous in order that they could provide more candid, truthful answers.

It was obvious from the answers received that the contirubtors worked very hard making the answers as truthful as possible. Again, the authors thank you.

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APPENDIX B
QUESTIONNAIRE

INTRODUCTION

This appendix contains Part Two of the questionnaire, plus Questions 1 through 4 and 25 of Part Three (renumbered Questions 160 through 164 of Part Two). Other reports will contain the balance of the questionnaire.

The questionnaire, as printed in this report is a modified version of the questionnaire as originally answered. This was done for the following reasons:

(1) Not all questions had accompanying multiple choice answers but were narrative in nature,

(2) The original questionnaire contains space for project managers to add their own comments as answers to the questions rather than select one of the pre-given answers, and

(3) There were errors (typo and otherwise) in the original survey which needed correcting.

The procedures used to report on those questions that did not have preselected answers was to modify the original questionnaire to make it "look like" the authors had preselected these possible answers and the participants had checked them. In truth, the answer set was derived from the submitted answers. To indicate which questions were originally narrative in form, a notation in parenthesis following the question will indicate "originally narrative."

In addition, the original questionnaire contained space for project managers to add their own comments as answers to the questions rather than select one of the pre-given answers. This was encouraged by the authors in order to insure that the answers to the questionnaire were as accurate as possible and not distorted by forcing the participant to only select from our pre-conceived answers. Again, to provide structure so the answers can be encoded in a computer data base system, the "comment" answers were grouped and the possible "answer set" expanded to include these answers. To indicate these additional answers the word "added" will be placed in parenthesis at the end of the question.

In contrast, Questions 33, 51, 52, 67, 68, 90, 115, 127, 159, and 164 were left in narrative form. This was done because of the extreme number of different answers that were submitted. These questions were very open-ended questions pertaining to "lessons learned" and "research needed," and were extremely varied and opinionated. These questions are answered by encoding the variety of answers and entering this code on the tabulation sheets.

Other modifications were made to the original questionnaire where the participants indicated the question was poorly worded or where the participants modified the original question by the insertion of a word or phrase. The authors inserted these in the interest of making this version of the questionnaire more complete. These additions to the original questions and/or original answers are indicated by placing the added portion in brackets "[ ]" and placing the word "added" in parenthesis at the end of the question or answer.

Where typographical errors were made, the questionnaire was corrected. The corrected word was contained in brackets "[ ]" and the word "corr" placed in parenthtesis at the end of the question or answer.

The authors hope that the above explanations do not appear to be too complex. They were done purely in the interest of conveying the maximum amount of information to the reader about the original questions and the possible answers presented to the respondent. The questionnaire follows.

After the questionnaire was sent out, it was discovered that there were two Questions 68. This was corrected by having the second Question 68 renumbered 69f.

References were added where they were needed or where the addition of a reference would make the question clearer. An abbreviated source is contained in brackets "[ ]" and the complete source follows this appendix.

RULES AND CONDITIONS FOR PARTICIPATING IN SURVEY

It is important that no company, or individual suffer any loss of proprietary information or receive unfavorable publicity as a result of this survey. Each individual participating in the survey has our full assurance that the data he provides will be treated in accordance with the above principles. In order to achieve this we stipulate the following:

1. Unless specifically authorized, the names of participating firms, or individuals will not be listed in the report as contributors.

2. The anonymity of the company, department, individual, and project will be preserved in every instance.

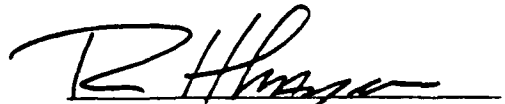
3. Any proprietary or company confidential information, if so identified (by writing "CONF" beside the question) will be protected and used only in deriving statistical data.

4. The individual completing the questionnaire can omit the answer to any question without invalidating the questionnaire.

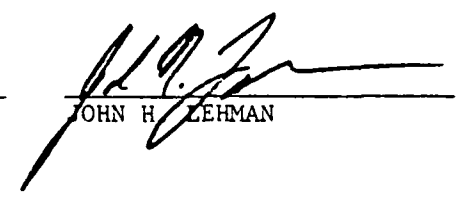
5. Only if cleared for further dissemination will raw data (completed forms) be made available to the participating AIAA TC members, should such request be made, to assist them in research work of their own. Without exception, all company, department, project, and individual names, as well as responses identified as "CONF" will be systematically deleted prior to release.

6. If so requested by the submitter, only statistical data will be derived from the survey, and the survey form destroyed upon publication of the final report.

Though it is seen as providing benefits to all participants, including the U.S. Air Force, this survey is not sponsored by the U.S. Air Force, or any individual, group, committee, or company, and does not imply any obligation on the part of the participants. It is being accomplished solely to provide data to be presented at the AIAA Conference, Computers in Aerospace, 31 Oct - 2 Nov 1977, Los Angeles, California.



RICHARD H. THAYER



JOHN H. LEHMAN

MEMO OF UNDERSTANDING

I make the following stipulations under which this survey can be used: (Please sign each stipulation you wish to make as precondition to submitting this survey. Line through those paragraphs which do not apply.)

This survey with company, department, project and other identifying markings, and with all answers marked "CONF" deleted can be duplicated and provided to the TC members at their request.

_____ Signature of Submitter

This survey can only be used to provide statistical data and cannot be released to the TC members for their use in any but a composite statistical or summary form. Following publication of final report both this form and the survey must be destroyed by shredding, pulping, or similar means.

_____ Signature of Submitter

I authorize the release of the firm name in a list of participants to be included as an addendum to the final report. The desired name, title, etc., is:

_____

_____

_____

_____ Signature of Submitter

A SURVEY OF MANAGEMENT TECHNIQUES AND PROCEDURES EMPLOYED IN SOFTWARE DEVELOPMENT PROJECTS

INSTRUCTIONS

Each survey packet comprises three parts. The number of packets provided will, in most cases, match the number of projects to be reported on plus one spare. If more forms are required you may copy or call.

PART ONE of the survey deals with defining the total organization and the overall management structure, requirements, and philosophy, and is intended to be answered by top management. It provides the backdrop against which the individual projects are to be viewed. Normally, only one copy of PART ONE should be completed per mailing, but each packet contains PARTS ONE, TWO, and THREE for the sake of uniformity and the chance that, in some instances, additional PART ONES would be called for.

A PART TWO is to be completed for each project reported on, and is intended to be completed by the project manager. (It is assumed the project is completed or almost completed) If those methods now often referred to as Modern Programmer Productivity Techniques (top down design, structured programming, et al.) are being used in whole, or in part, in your development activities, you should consider selecting a representative sample of before and after projects in completing the survey.

PART THREE consists of general questions not related to any specific project, and is also intended to be completed by a project manager. One PART THREE is included in each packet on the assumption that each project will be reported on by a different project manager. If one manager reports on more than one project, he or she would only complete PART THREE one time.

The dynamic nature and infinite diversity of the entire field of Data Processing has kept the jargon from becoming universally defined. For this reason we have attempted to avoid terms that might have more than one meaning. If questions appear vague or imprecise, feel free to call for clarification. Or, if you prefer, rewrite the question to ask what you believe the point to have been, or to relate it to your particular environment.

The answers provided for each question are not the universal set of possible responses, so, if you believe selecting one of the canned replies would be misleading please select "other" or "comment" and explain. If more space is required, write in the margins indicating the number of the question being answered. If a question defies

answering either through complexity, non-relevance to your environment, or excessive research feel free to leave it blank or enter an appropriate comment. If you write "CONF" in the left margin adjacent to any question, that response will be treated as confidential/proprietary data as described under "Rules and Conditions..", attachment 1 to the basic letter.

If possible, avoid direct reference to specific firms, projects, and people. Each set of questionnaires has been numbered in order that we might keep related responses together and facilitate accounting. Base numbers have been selected at random and no algorithym has been employed that would facilitate pairing firms with forms.

We very much appreciate the time and effort you're putting into this. Your time, effort, and candor are essential to the success of our joint effort.

Please return the completed surveys in the return envelope provided or mail to:

Colonel Richard H. Thayer
SM-ALC/ACD
McClellan AFB, CA 95652

A SURVEY OF MANAGEMENT TECHNIQUES AND PROCEDURES

EMPLOYED IN SOFTWARE DEVELOPMENT PROJECTS

PART TWO (Modified)

SECTION 1 - PROJECT IDENTIFICATION

INTRODUCTION. PART TWO of this survey pertains to the management of a specific, individual, software development project and is intended to be answered by the Project Manager. It is assumed that the project being reported on is complete or almost complete.

THE IDENTIFICATION NUMBER ASSIGNED THIS FORM IS_____.

Please return completed form in envelope provided or mail to:

Colonel Richard H. Thayer
SM-ALC/ACD
McClellan AFB, CA 95652

1. What was/is your position in relation to the project you are reporting on? (Originally narrative)

a. Project manager [ ]
b. Software project manager [ ]
c. Project manager's supervisor (Program manager) [ ]
d. Technical director or Technical advisor [ ]
e. Project individual [ ]
f. Corporate officer [ ]
g. Customer [ ]
z. Other:_____ [ ]

PROGRAM IDENTIFICATION

2. In what applications/functional area(s) did this [software] project fall? (added)

a. Commercial/business, such as inventory control, payroll, accounting and finance, etc. [ ]
b. Data acquisition/retrieval [ ]
c. Scientific, such as engineering calculations, data reductions, etc. [ ]
d. Simulation or modeling applications [ ]
e. Process control to include embedded computer systems [Manley, 1974] [ ]
f. Command and control systems [ ]
g. Management information systems [ ]

h. Communication systems, message switching [ ]

i. Computer systems, such as software monitors, compilers, operating systems and other system software [ ]

z. Others:_____ [ ]

3. The project was:

a. A new software development [ ]

b. A continuation of a previously completed software development [ ]

c. A major modification of an existing software system [ ]

z. Other;_____ [ ]

4. If the project was a major modification did it involve:

a. Transferring existing software to a different computer [ ]

b. Rewriting application software [ ]

c. Writing a new operating system [ ]

y. Project was not a major modification to an existing system [ ]

z. Other:_____ [ ]

5. The software product was designed for:

a. Commercial off-the-shelf computer hardware [ ]

b. Commercial off-the-shelf operating system [ ]

c. Modified commercial off-the-shelf computer hardware (added) [ ]

d. Modified commercial off-the-shelf operating system [ ]

e. Special purpose computer [hardware] system (added) [ ]

f. Special purpose operating system [ ]

z. Other:_____ [ ]

COMMERCIAL HARDWARE IDENTIFICATION

6. If the software system was being developed for commercial [computer] hardware, was selection and delivery of the commercial hardware part of the overall project? (added)

a. Yes [ ]

b. No [ ]

c. No, furnished by user (added) [ ]

y. System was not developed for commercial off-the-shelf computer hardware [ ]

z. Comment:_____ [ ]

7. If off-the-shelf [computer] hardware was used, in what mode of operation did the production system run? (added)

a. Batch [ ]

b. Remote batch/remote job entry terminal (RJET) [ ]

c. Interactive processing [real time] (added) [ ]

d. Transaction processing [ ]

e. Stand alone [ ]

y. System was not developed for commercial, off-the-shelf computer hardware [ ]

z. Other:_____ [ ]

8. If the target (production) computer for this software capability was an off-the-shelf commercial system:

a. Give manufacturer, make, and model_____ [ ]

b. Give operating system employed_____ [ ]

y. Host computer was not a commercial computer [ ]

z. Comment:_____ [ ]

9. If the host (development) computer for this software capability was an off-the-shelf commercial system:

a. Give manufacturer, make and model_____ [ ]

b. Give operating system employed_____ [ ]

y. Host computer was not a commercial computer [ ]

z. Comment:_____ [ ]

SPECIAL PURPOSE HARDWARE IDENTIFICATION

10. If the software system was developed for special purpose hardware, was the hardware development part of the overall project?

a. Yes [ ]

b. No [ ]

y. System was not developed for special purpose hardware [ ]

z. Comment:_____ [ ]

11. If the software system was developed for special purpose hardware what type was this?

a. Embedded central processor [ ]

b. Special terminals such as those employed in command and control and airborne systems, etc. [ ]

c. Special systems such as radar sensors, or process control devices, trainers, etc. [ ]

y. System was not developed for special purpose hardware [ ]

z. Other:_____ [ ]

12. If a host (development) commercial hardware system was used in developing this special purpose capability:

a. Give manufacturer, make, and model_____ [ ]

b. Give operating system employed_____ [ ]

c. System was developed on special purpose computer [ ]

y. System was not developed for special purpose hardware (added) [ ]

z. Comment:_____ [ ]

CUSTOMER IDENTIFICATION

13. The customer or user was: [Taken partly from Computer Decisions Subscription Application form, Jun 1977 Issue]

a. In-house to my company or major division [ ]

b. Within my parent organization [ ]

c. A manufacturer of computer hardware [ ]

d. A manufacturer of other than computer hardware [ ]

e. A "software house" [ ]

f. An engineering service and technical support organization [ ]

g. The Government: federal (non-military), federal (military), state, county, municipal [ ]

h. A university or educational institution [ ]

i. A computer service bureau, time-sharing service bureau [ ]

j. An ADP consultant and/or education service [ ]

k. Financial: banking, insurance, real estate, securities, credit [ ]

l. In the wholesale or retail trade [ ]

m. In medical or legal services [ ]

n. In transportation services [ ]

o. Utilities: communications, electric, gas [ ]

p. Foreign government (added) [ ]

z. Other:_____ [ ]

14. Was the customer purchasing the software system for other users?

a. Yes [ ]

b. No [ ]

z. Comment:_____ [ ]

15. Are (is) there:

a. Multiple users of the system [ ]

b. Only one user [one or more locations] (added) [ ]

z. Comment:_____ [ ]

CONTRACT IDENTIFICATION

16. Under which of the following contract types or agreements was the software system developed? [AFPR, 1976]

a. Firm fixed price [ ]

b. Fixed price with economic price adjustment [ ]

c. Fixed price incentive [ ]

d. Firm fixed price level of effort [ ]

e. Cost [ ]

f. Cost sharing [ ]

g. Cost plus incentive fee [ ]

h. Cost plus award fee [ ]

i. Cost plus fixed fee [ ]

j. Time and materials [ ]

k. Labor-hour [ ]

l. Basic ordering agreement [ ]

y. No contract was used (added) [ ]

z. Other:_____ [ ]

17. If the contract had an incentive clause [for software], what was the incentive based on? (added)

a. Reduced [or meets] cost (added) [ ]

b. Early [or meets] delivery (added) [ ]

c. Increased performance (explain how it was measured)____ [ ]

_____

y. Contract did not have an incentive clause [ ]

z. Other:_____ [ ]

COST AND SCHEDULE IDENTIFICATION

18. What was the total cost of the project to the customer? (If exact amount not available, please give a range or explain)

$_____

19. How much of the total cost (estimated) was attributable to the production of software, including machine time, programmer salary, [management of software development, overhead related to software], and other ADP operating expenses? (added)

$_____

20. This project began (first assignment) in_____ (month, year) and ended, [or will end] (sign off) in_____ (month, year). (added)

SOFTWARE IDENTIFICATION

21. In what language was this data system programmed? If more than one language was used please indicate appropriate percentages.

a. FORTRAN _____%

b. JOVIAL _____%

c. COBOL _____%

d. Assembler [(unspecified)] (added) _____%

e. CMS-2 (added) _____%

f. PL/1 (added) _____%

g. Higher order language [(unspecified)] (added) _____%

z. Other:_____ _____%

22. In total, approximately how many lines of source code were written?

a. Executable_____

b. Comments:_____

c. Other non-executable_____

COMPLEXITY IDENTIFICATION

23. Using Table 1 on the following page please estimate the complexity of the data system (from 12 to 60). All descriptions pertain to software only. The complexity rating:_____

DATA BASE IDENTIFICATION

24. Approximately how large a data base was the system designed for: (Fill in blank with number of bytes of data)_____

_____

FACTORS	1	2	3	4	5
1 ORIGINALITY REQUIRED	NONE-REPROGRAM ON DIFFERENT EQUIPMENT	MINIMUM MORE STRINGENT REQUIREMENTS	LIMITED-MORE ENVIRONMENT NEW INTERFACES	CONSIDERABLE APPLY EXISTING STATE OF ART TO ENVIRONMENT	EXTENSIVE REQUIRES ADVANCE IN STATE OF THE ART
2 DEGREE OF GENERALITY	HIGHLY RESTRICTED SINGLE PURPOSE	RESTRICTED PARAMETER DEFD FOR A RANGE OF CAPACITIES	LIMITED FLEXIBILITY ALLOWS SOME CHANGE IN FORMAT	MULTI PURPOSE FLEXIBLE FORMAT RANGE OF SUBJECTS	VERY FLEXIBLE ABLE TO HANDLE A BROAD RANGE OF SUBJECT MATTER ON DIFFERENT EQUIPMENT
3 SPAN OF OPERATION	LOCAL OR UTILITY	COMPONENT COMMAND	SINGLE COMMAND	MULTI-COMMAND	DEFENSE DEPARTMENT WORLD WIDE
4 CHANGE IN SCOPE AND OBJECTIVE	NONE	INFREQUENT	OCCASIONAL	FREQUENT	CONTINUOUS
5 EQUIPMENT COMPLEXITY	SINGLE MACHINE ROUTINE PROCESSING	SINGLE MACHINE ROUTINE PROCESSING EXTENDED PERIPHERAL SYSTEM	MULTI-COMPUTER STANDARD PERIPHERAL SYSTEM	MULTI-COMPUTER ADVANCED PROGRAMMING COMPLEX PERIPHERAL SYSTEM	MASTER CONTROL SYSTEM MULTI-COMPUTER AUTO INPUT/OUTPUT AND DISPLAY EQUIPMENT
6 PERSONNEL ASSIGNED	1-2	3-5	5-10	10-18	18 AND OVER
7 DEVELOPMENTAL COST	1-10K	10-50K	50-200K	200-500K	OVER 500 K
8 CRITICALITY	DATA PROCESSING	ROUTINE OPERATIONS	PERSONNEL SAFETY	UNIT SURVIVAL	NATIONAL DEFENSE
9 AVERAGE RESPONSE TIME TO PROGRAM CHANGES	2 OR MORE WEEKS	1-2 WEEKS	2-7 DAYS	1-3 DAYS	1-24 HOURS
10 AVERAGE RESPONSE TIME TO DATA INPUTS	2 OR MORE WEEKS	1-2 WEEKS	1-7 DAYS	1-24 HOURS	0-60 MINUTES
11 PROGRAMMING LANGUAGES	HIGH LEVEL LANGUAGE	HIGH LEVEL AND LIMITED ASSEMBLY LANGUAGE	HIGH LEVEL AND EXTENSIVE ASSEMBLY LANGUAGE	ASSEMBLY LANGUAGE	MACHINE LANGUAGE
12 CONCURRENT SOFTWARE DEVELOPMENT	NONE	LIMITED	MODERATE	EXTENSIVE	EXHAUSTIVE

TABLE 1 - Level of Project Complexity

SECTION 2 - REQUIREMENT SPECIFICATIONS, INPUT CONDITIONS, AND ENVIRONMENT

REQUIREMENT SPECIFICATIONS

25. Who prepared the requirement specifications?

a. The customer [ ]

b. An organization affiliated with the customer, but not the customer himself [ ]

c. Your organization, e.g., a two-step procurement, an unsolicited proposal, etc. [ ]

d. An outside consulting firm [ ]

e. A third contractor, e.g., an integrating contractor [ ]

y. None prepared (added) [ ]

z. Other:_____ [ ]

26. If your organization prepared the requirement specifications did the customer participate?

a. Yes [ ]

b. No [customer did not participate] (added) [ ]

c. No, customer was source (added) [ ]

y. Not applicable, your organization did not prepare specifications (added) [ ]

z. Comment:_____ [ ]

27. On a scale of 1 to 7, with 1 being little more than the name of the system, and 7 being complete specifications down through preliminary design, how detailed were the specifications provided?

_____

28. Was it necessary to rewrite the specifications before proceeding with design?

a. Yes (specify percent rewritten)_____% [ ]

b. No [specifications were adequate] (added) [ ]

c. Yes, however specifications never rewritten (added) [ ]

d. Yes, rewritten concurrent with design (added) [ ]

y. Not applicable, requirement specifications were never written (added) [ ]

z. Comment:_____ [ ]

29. If it was necessary to rewrite the specifications, what was the reason? (originally narrative)

a. Errors in specification [ ]

b. Specifications were ambiguous, incomplete, and/or inconsistent [ ]

c. Change in scope of project [ ]

d. Change in requirements of project [ ]

e. Change in hardware design [ ]

f. Normal way of doing business [ ]

g. Customer and/or developer became better informed [ ]

y. Was not necessary to rewrite specifications or requirement specifications were not prepared [ ]

z. Other:_____ [ ]

30. The specifications were prepared:

a. Using top-down (Hierarchy of Function) techniques [ ]

b. Using structured design/flow techniques [ ]

c. In phases, with design and coding started before the requirement specification was completed [ ]

d. In a formal requirement language (describe)_____ [ ]

_____

e. In such a manner as to facilitate tracking the development of software from requirements through coding and tie each delivered software module to some part of the requirements (approximately_____% of the requirement could be tracked). [ ]

f. In precise, measureable terms to aid in development of acceptance testing (approximately_____% of the requirements could be measured). [ ]

g. According to MIL-STDs (added) [ ]

y. Specification never prepared/none (added) [ ]

z. Comment:_____ [ ]

DOCUMENTATION REQUIRED BY THE CONTRACT/CUSTOMER

31. The following is a list of documentation that may be required by a software development contract. Check each document required in the project and add required documentation not contained in the list. [DOD Manual 4120.17M, (Dec 1972)]

a. Object Listing/Deck/Tape [ ]

b. Source Listing/Deck/Tape [ ]

c. Functional description--initial definition of a project which provides the ultimate user with a clear statement of the operational capabilities to be developed (also sometimes called requirements specifications). [ ]

d. Data requirements document--prepared by both system and user personnel when a data collection effort by the user group is required to generate and maintain system files. [ ]

e. System/subsystem specification--prepared for system personnel, as detailed as possible, concerning the environment and design elements, in order to provide maximum guidance to the program design effort; also defines system subsystem interfaces. [ ]

f. Program specifications--prepared for programmers; contains considerable detail for the purpose of guiding program development. [ ]

g. Data base specification--prepared for programmers in sufficient detail to permit program coding and data base generation by the programming group. [ ]

h. Users Manual--to present general and specific information on how a specific computer program will be used [(includes positional handbook for remote input terminals)]. (added) [ ]

i. Computer Operations Manual--contains precise detailed information on the control, requirements and operating procedures necessary to successfully initiate, run, and terminate the subject system. [ ]

j. Program Maintenance Manual--contains general and specific information for computer personnel responsible for the maintenance of the computer programs. [ ]

k. Test and Implementation Plan--contains an orderly schedule of events and lists of material necessary to affect testing and delivery of a complete data processing system. [ ]

l. Test Analyst Report--describes the status of the computer program system after test and provides a presentation of deficiencies for review by staff and management personnel. [ ]

m. Software development plan (added) [ ]

n. Software standards and requirements (added) [ ]

o. Management reports (added) [ ]

p. Interface control (added) [ ]

q. Budget (added) [ ]

r. Progress Reports (added) [ ]

s. Error/discrepancy report (added) [ ]

t. Program change requests/status (added) [ ]

u. Version description (added) [ ]

v. Software product/output specifications (added) [ ]

y. Documentation not required (added) [ ]

z. Other:_____ [ ]

SPECIFIC CUSTOMER REQUIREMENTS

32. Which of the following were specified by the customer?

a. A specific computer (this was_____) [ ]

b. Storage limitations (these limitations were_____) [ ]

c. Speed constraints (explain_____) [ ]

d. A specific language (this language was_____) [ ]

e. His participation in the design function [ ]

f. His participation in the coding function [ ]

g. Prioritized requirements [ ]

h. Development under life-cycle costing concepts [ ]

i. Development under design-to-cost concepts [ ]

j. Development under modern programming techniques [ ]

k. Portability [ ]

l. Human engineering [ ]

m. Security [ ]

n. Safety [ ]

o. MIS-S-52779 [ ]

p. Modified MIL-S-52799 (how modified)_____ [ ]

q. Types of review [ ]

r. Frequency of review [ ]

s. Input data [ ]

t. Output requirements [ ]

u. Test plan/procedure [ ]

v. A particular reliability figure to attain (if so, what method of measuring software reliability did the customer specify?)_____ [ ]

w. A maintainability goal to attain (if so, what method of measuring software maintainability did the customer specify?)_____ [ ]

_____

y. Customer did not specify (added) [ ]

z. Comment:_____ [ ]

aa. A followup maintenance contract (time in months_____) [ ]

bb. Customer training [ ]

cc. A warranty of the software for a period of time (give time in calendar months)_____ [ ]

GENERAL

33. If you could affect the method by which requirements were specified, or were able to initiate research into improving the requirements specification function, what action would you take?

_____

_____

_____

_____

SECTION 3 - PLANNING

PLANNING AND SCHEDULING

34. Who did the planning before the project was assigned to a group or individual for accomplishment?

a. A [permanent] planning group set up for this purpose (added) [ ]

b. An ad hoc planning group (added) [ ]

c. A steering committee which established costs and schedules [ ]

d. An on-going project (added) [ ]

e. Program manager was picked, and he did the initial planning [ ]

f. A staff function [ ]

y. No planning accomplished (added) [ ]

z. Other:_____ [ ]

35. In planning for this project did/was:

a. The project manager use a formal planning guide? [ ]

b. The customer actively participate in the planning function? [ ]

c. A work breakdown structure (WBS) employed in planning the software development? (approximately how many levels)_____ [ ]

d. The project divided into separate phases for the purpose of planning? [ ]

y. None (added) [ ]

z. Comment:_____ [ ]

36. What tools were used in planning the project?

a.	PERT	[ ]	f.	Milestone (added)	[ ]
b.	Modified PERT	[ ]	g.	CSCS (added)	[ ]
c.	[CPM] (corr)	[ ]	h.	WBS (added)	[ ]
d.	GANTT	[ ]	y.	None	[ ]
e.	Workloading charts	[ ]	z.	Other:_____	[ ]

37. What method was used in estimating the cost and schedule for the project?

a. A formula [top-down] (added) [ ]

b. Estimates based on a similar project [ ]

c. Provided by somebody who had a knack for estimating correctly [ ]

d. Bottom-up aggregating (added) [ ]

e. Cost and/or schedule were dictated (added) [ ]

f. Simulation model [ ]

g. Crystal ball (or similar means) [ ]

y. Cost and schedule not estimated (added) [ ]

z. Other:_____ [ ]

38. If the formula approach [and/or other estimating technique] was used what were the elements or variables considered? (added) [Olsen, 1977]

a. Computer time [ ]

b. Documentation [ ]

c. Training [ ]

d. Travel [ ]

e. Site preparation/ construction [ ]

f. Ratio management & overhead to programmers [ ]

g. Keypunch [ ]

h. Office supplies [ ]

i. Office space [ ]

j. Personnel equipment, i.e., desks, pencils, paper, etc. [ ]

k. Programmer proficiency [ ]

l. Program complexity/ function [ ]

m. Tester proficiency [ ]

n. Number of modules (sub routines) [ ]

o. Lines of code (added) [ ]

p. Size of program (added) [ ]

q. Requirement specification completeness (added) [ ]

r. Customer support (added) [ ]

s. Historical data (added) [ ]

t. Availability of support software (added) [ ]

u. Calendar period (added) [ ]

v. Size of data base (added) [ ]

w. Experience (newness) with system (added) [ ]

y. Not used [ ]

z. Other:_____ [ ]

_____

39. After the original software development plan and schedule were determined and submitted for review by senior management and/or customer was:

a. The delivery data shortened by senior management [ ]
b. The delivery data shortened by the customer [ ]
c. The delivery data lengthened by senior management [ ]
d. The delivery date lengthened by the customer [ ]
e. The delivery data originally dictated (added) [ ]
f. The requirements changed to match schedule (added) [ ]
g. Resources reduced (added) [ ]
y. No change (added) [ ]
z. Comment:_____ [ ]

40. In the process of software system development which of the following planning documents were prepared?

a. Project management [ ]
b. Resource requirements [ ]
c. Organization [ ]
d. Staffing [ ]
e. Training [ ]
f. Test [ ]
g. Software development [ ]
h. Phase and/or delivery [ ]
i. Documentation [ ]
j. Implementation [ ]
k. Data conversion [ ]
l. Change control [ ]
m. Configuration management (added) [ ]
n. Review & reporting [ ]
o. Product assurance (added) [ ]
p. Work Breakdown Structure (added) [ ]
q. Budget (added) [ ]
y. None [ ]
z. Other:_____ [ ]
_____

41. From project inception through delivery of the completed system, approximately what percent of the time was spent by all personnel in planning for software? _____%

42. In a further breakdown of planning activities, approximately what percentage of the time was spent on each of the following? (Should approximate 100%)

a. Organizational planning _____%
b. Staff planning _____%
c. Developing Control procedures _____%

d. Administration planning _____ %

e. Quality assurance planning _____ %

f. Developing an overall project management plan _____ %

g. Design standards (added) _____ %

h. Test planning (added) _____ %

i. Document and configuration management planning (added) _____ %

y. None (added) [ ]

z. Other: _____ [ ]

43. The system was:

a. Delivered to the user as an entity [ ]

b. Delivered to the user in phased increments [ ]

z. Other: _____ [ ]

44. Was every major software module designed in total before any coding was started?

a. Yes [ ]

b. No (percent of design completed when coding started _____ %) [ ]

z. COMMENT: _____ [ ]

QUALITY ASSURANCE (QA) PROGRAM PLAN

45. A QA program was:

a. Applied informally [ ]

b. Applied formally and documented separately [ ]

c. Applied formally and documented as part of the project management plan [ ]

y. Not applicable to [or used on] this project (added) [ ]

z. Comment: _____ [ ]

46. In which of the following areas were formal [and/or] documented QA standards applied and were these company-wide standards or standards developed specifically for this project? (added) [Boeing, 1976]

		A Company-Wide Standards	B Local to Project
a.	Documentation	[ ]	[ ]
b.	Work breakdown structure (WBS) code	[ ]	[ ]
c.	Scheduling	[ ]	[ ]

		A Company-Wide Standards	B Local to Project
d.	Performance measurement	[ ]	[ ]
e.	Requirement analysis	[ ]	[ ]
f.	Preliminary design	[ ]	[ ]
g.	Detail design	[ ]	[ ]
h.	Coding	[ ]	[ ]
i.	Test planning	[ ]	[ ]
j.	Software verification	[ ]	[ ]
k.	Reviews and audits	[ ]	[ ]
l.	Configuration management	[ ]	[ ]
m.	Discrepancy reporting and correction	[ ]	[ ]
n.	Software acceptance	[ ]	[ ]
y.	No formal [or documented] QA standards (added)	[ ]	[ ]
z.	Other:_____	[ ]	[ ]

47. Which of the "modern programmer practices" given below were used in the software development project?

a. Program manager authority--both technical and administrative responsibility for project [Black, 1977] [ ]

b. Reviews--formal milestone reviews at the end of each phase [Black, 1977] [ ]

c. Unit development folders--capture of working materials for each identified item to facilitate end item development, testing, documentation [Ingrassia, 1976] [ ]

d. Design discipline and verification--top-down design, formal design representation, completion of design, and deliberate verification of design prior to code [Black, 1977] [ ]

e. Program modularity--definitions/restrictions on data interfaces between modules, adherence to parent/child relationships between modules. [Black, 1977] [ ]

f. Naming conventions--structured names for modules and/or data items [Black, 1977] [ ]

g. Structured forms--use of Dijkstra forms as supportable in your programming language [1972] [ ]

h. Structured walkthroughs--deliberate peer reviews of code for each module [Weinberg, 1971] [ ]

i. Structured analysis--a formal description of the users requirements [Yourdon, 1976] [ ]

j. Structured design--building system from small, highly independent, single purpose modules [Yourdon, 1976] [ ]

k. Chief programmer teams--a development organization around a programmer of great ability [Baker, 1972] [ ]

l. HIPO--a documentation technique [IBM, 1975] [ ]

m. Support libraries and facilities--use of automated or proceduralized design, coding and configuration management acceptance testing [Black, 1977] [ ]

n. Phased testing--defined and formalized unit, functional, and acceptance testing. [Black, 1977] [ ]

o. Configuration management/change control--creation and control of baselines and procedures for problem reporting and resolution. [Black, 1977] [ ]

y. None of the above (added) [ ]

z. Other:_____ [ ]

48. Which of the below listed documentation types were used in the project? If a single document covered more than one area, check each area accounted for. The intent of this question is to determine which areas were covered by documentation not the actual document form. [See Section 2 for definitions]

a. Functional description [ ]

b. Data requirements document [ ]

c. System/subsystem specification [ ]

d. Program specifications [ ]

e. Data base specifications [ ]

f. Users manual [ ]

g. Computer operations manual [ ]

h. Program maintenance manual [ ]

i. Test analyst report [ ]

j. Test plans (added) [ ]

k. Interface control (added) [ ]

l. Training course (added) [ ]

m. Version description (added) [ ]

n. Software development plan (added) [ ]

y. None (added) [ ]

z. Other:_____ [ ]

49. Which software tools/aids were selected for use on this project?

a. Structured pre-compilers [ ]

b. Automatic flowcharters [ ]

c. Library monitors [ ]

d. Macro programming capabilities [ ]

e. On-line capabilities [ ]

f. On-line dubugging [ ]

g. Automatic test case generators [ ]

h. Simulators or drivers (added) [ ]

i. Batch debugging aids (added) [ ]

j. Standards auditors (added) [ ]

y. No software tools/aids employed [ ]

z. Other:_____ [ ]

50. Which test tools/techniques/methods were selected for use on this project? [Hartwick, 1977]

a. Comparators--used to compare the code of one program version to that of another for coding errors [ ]

b. Editors--analyze source code [ ]

c. Flowcharting--show the logic structure of a program [ ]

d. Logic/Equation generators--translates assembly language programs into a machine-independent microprogramming language and builds the microprogramming statements into networks to analyze the flow of control and reconstruct arithmetic statements [ ]

e. Program structure analyzers--analyze program paths under input control [ ]

f. Correctness Proofs--establishes that a given program performs a desired function and halts [ ]

g. Symbolic Program Executions--decompose source code by logically executing it [ ]

h. Initialization Tests--the performance of all initialization operations is tested to assure that all indicated initialization operations are performed and that correct values of all initialized quantities result [ ]

i. Interaction Test--all quantities, variables, and system conditions obtained from other modules are examined to determine the sensitivity of the module under test to their possible values or states [ ]

j. Arithmetic Test--the precision of arithmetic calculations is checked to discover where insufficient precision is attained or incorrect arithmetic calculations are performed [ ]

k. Timing Analysis--the longest and shortest possible execution times for all tests are determined to establish the execution time requirements for the module and to identify potential timing problems [ ]

l. Branch Logic Test--the correct branching decision paths for each branch and each closed-loop test case are checked. The branch decision paths that are not exercised in any of the normal test cases are identified and their correctness demonstrated by special test cases [ ]

m. Comparison of system output with manual output the system will replace (added) [ ]

n. Real world simulation (added) [ ]

y. None (added) [ ]

z. Other:_____ [ ]

GENERAL

51. If you had total control of the planning function within your organization, or were able to initiate research into how to improve the planning function, what actions would you take?

_____

_____

_____

_____

52. If it were in your power to make changes in the way technical decisions are made concerning programming techniques, test procedures, documentation standards, etc., what action would you take?

_____

_____

_____

_____

SECTION 4 - ORGANIZATION

DEFINITIONS [Heyel, 1973]

Line Organization--A line organization has a direct line of responsibility and control from the chief executive or general manager to intermediate line executives, to foreman and supervisors, to workers. A line or operating organizational unit is one that is actually doing the work that represents the primary mission of the larger organizational unit. Examples are aircraft manufacturing, radar construction and installation, supply and transportation of spare parts, building and launching a MARS lander, teaching in a university, etc.

Staff Organization--A staff organization is given responsibility and authority over special activities, such as inspection, employment, purchasing, legal, engineering, automatic data processing (ADP), etc. A staff or service organizational unit is any unit which is helping the line do its work, but is only responsible for the special activity not the final product of the larger organizational unit.

Matrix Organization--A matrix organization is built around specific projects. A manager is given the authority, responsibility, and accountability for completion of the project. The line or staff organizations provide qualified personnel when needed, who return to their parent organization when their task is done. The project manager usually does not have authority or responsibility to hire, discharge, train, or promote personnel. This is the responsibility of the line or staff manager.

Project Organization--A project organization is similar to a matrix organization except that the personnel are permanently assigned to the organization. The manager is also given the authority, responsibility and accountability for completion of the project. However, the manager must meet his goals within the resources of his organization. The manager usually has responsibility to hire, discharge, train, and promote personnel within his project organization.

PREORGANIZATIONAL FUNCTION

53. To which organization within the firm was this software development project first assigned:

a. A line organization under the authority of the senior ADP manager [ ]

b. A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

c. A staff organization under the authority of the senior ADP manager [ ]

d. A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

z. Other:_____ [ ]

54. Which organization was responsible for determining the initial budget, delivery schedule, resource requirements, computer availability, etc., [for software]? (added)

a. The organization to which the project was initially assigned [ ]

b. A line organization under the authority of the senior ADP manager [ ]

c. A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

d. A staff organization under the authority of the senior ADP manager [ ]

e. A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

z. Other:_____ [ ]

When this project was initially assigned:

a. The ultimate project manager participates in determining the schedule, budget figures, etc. [ ]

b. The planning, budgeting, and allocation of resources was done by a special staff established for this function. (give name_____) [ ]

c. An ad hoc group was set up to handle the initial assignment until a permanent group was established [ ]

z. Comment:_____ [ ]

PROJECT MANAGEMENT ORGANIZATION

56. To which organization was the [software] project assigned for development? (added)

a. The organization to which the project was initially assigned [ ]

b. The organization responsible for determining initial budget, schedule, etc. [ ]

c. A line organization under the authority of the senior ADP manager [ ]

d. A line organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

e. A staff organization under the authority of the senior ADP manager [ ]

f. A staff organization outside the authority of the senior ADP manager [or no senior ADP manager] (added) [ ]

z. Other:_____ [ ]

57. The software development was organized under [the following project types]: (added)

a. A project organization [ ]

b. A matrix organization [ ]

c. A project manager with administrative authority while the actual development work was done by line and staff organizations [ ]

y. Not organized under a project [type] organization (added) [ ]

58. In this project:

a. Software development was handled within the ADP environment with functional analysts or prospective users being assigned or attached to the development team [ ]

b. ADP specialists were detailed or assigned to the functional user for the duration of the development effort [ ]

c. The functional user employed "analysts" who developed specifications, designs, algorithms, etc., which were then presented to the software development team for implementation [ ]

d. The ADP function was done by the functional analyst/user (i.e., ADP was not a separate function) (added) [ ]

e. The functional analysis was done by the ADP personnel (i.e., there was not a separate user analysis) (added) [ ]

y. None of the above (added) [ ]

z. Other:_____ [ ]

SOFTWARE ENGINEERING PROJECT TEAM

59. How many positions [(filled and unfilled)] supported the project? (added) _____

60. Was the [software] project organization divided into teams each headed by a technical leader? Note: In a small project organization with diverse activities it would be possible to have one-person teams. (added)

a. Yes [ ]

b. No [ ]

z. Comment:_____ [ ]

61. Which types of teams were employed in software development [(for the purpose of this question an engineer is considered an analyst)] (added)

a. Combined [functional] analysts-programmer team (added) [ ]

b. Separate software [functional] analysis team (added) [ ]

c. Separate programmer team [ ]

d. Separate test team [ ]

e. Separate integration team [ ]

f. Separate interface team [ ]

g. Separate product acceptance team (added) [ ]

y. Did not employ teams [ ]

z. Other:_____ [ ]

62. Which of the following functions were internal to the project management organization?

a. Administration [ ]

b. Project control [ ]

c. Program support librarian [ ]

d. Product/quality assurance (added) [ ]

e. Configuration management (added) [ ]

y. No functions of this type were integral in the project management organization [ ]

z. Others:_____ [ ]

63. To whom did the test team report?

a. The project manager [ ]

b. Other than project manager (added) [ ]

y. Did not employ a [separate] test team (added) [ ]

z. Other:_____ [ ]

64. ow many individual teams were assigned to the project?

_____

65. The teams were organized under:

a. A chief programmer [Baker, 1972] [ ]

b. A lead programmer (a senior experienced programmer) [ ]

c. Task leader/work leader/project leader (added) [ ]

d. Lead engineer/systems engineer/analyst (added) [ ]

y. Did not use teams [ ]

z. Others:_____ [ ]

66. Were any of the positions in the development organization referred to by the following titles? [Titles taken from Yourdon, How to Manage Structured Programming, 1976, and Brooks, Mythical Man-Month, 1975]

a. Chief programmer [ ]
b. Back-up programmer [ ]
c. Program support librarian [ ]
d. Surgeon [ ]
e. Administrator [ ]
f. Editor [ ]
g. Co-Pilot [ ]
h. Programming clerk [ ]
i. Tool smith [ ]
j. Tester [ ]
k. Language lawyer [ ]
l. Software architect [ ]
m. Software engineer (added) [ ]
n. Technical director (added) [ ]
y. None of the above (added) [ ]
z. Other:_____ [ ]

GENERAL

67. Which of the many forms of project organization do you feel contributes the most to the success of the project?

_____

_____

_____

_____

_____

_____

68. If you had it within your power to make one change in the way the project was organized, what action would you take, or if you had the resources available to undertake research in any area of project organization, which aspect would you explore?

_____

_____

_____

SECTION 5 - STAFFING

PROJECT MANAGER

69. What was the source of the project manager?

a. New hire from another company [ ]

b. New hire from school [ ]

c. Transfer from another project [ ]

d. Transfer from within company other than project [ ]

e. Promoted from within project (added) [ ]

f. The project manager was appointed or selected for this project by_____ [ ]

_____

y. Did not have a project manager (added) [ ]

z. Other:_____ [ ]

70. How many years experience did the project manager have in the following areas?

a. Functional area of project _____Yrs

b. Data processing _____Yrs

y. No experience [no project manager] (added) [ ]

z. Comment:_____ [ ]

71. How many years of prior experience did the project manager have in the following areas and capacities?

Capacity Area		A Functional Area Yrs	B Analyst/Programmer Yrs	C Team Member Yrs	D Project Manager Yrs
a.	Commercial/Business	___	___	___	___
b.	Scientific	___	___	___	___
c.	Simulation	___	___	___	___
d.	Process control (to include embedded computer systems)	___	___	___	___
e.	Command and control	___	___	___	___
f.	Mgt information system	___	___	___	___
g.	System software	___	___	___	___
h.	Real time applications	___	___	___	___
i.	Data communications	___	___	___	___
j.	Computer operations	___	___	___	___
y.	No experience/no project manager (added)	___	___	___	___
z.	Other:_____	___	___	___	___

72. In which programming languages and at what level of proficiency could the project manager program?

		HIGH	AVERAGE	LOW
a.	FORTRAN	[ ]	[ ]	[ ]
b.	JOVIAL	[ ]	[ ]	[ ]
c.	COBOL	[ ]	[ ]	[ ]
d.	Assembler [(unspecified)] (added)	[ ]	[ ]	[ ]
e.	CMS-2 (added)	[ ]	[ ]	[ ]
f.	PL/1 (added)	[ ]	[ ]	[ ]
g.	HOL [(unspecified)] (added)	[ ]	[ ]	[ ]
y.	None/no project manager (added)	[ ]	[ ]	[ ]
z.	Other:_____	[ ]	[ ]	[ ]

73. The age of project manager at the beginning of the project was _____years.

74. Was the project manager ever a Chief Programmer [As defined by Baker, 1972]?

a. Yes [ ]

b. No [ ]

y. No project manager (added) [ ]

z. Comment:_____ [ ]

75. Did the project manager receive training in any of the following areas prior to (or early in) the project development cycle?

a. Functional area of project [ ]

b. General data processing [ ]

c. Modern programming techniques [ ]

d. Project management [ ]

e. General management [ ]

f. Programming languages (give language_____) [ ]

y. None/no project manager (added) [ ]

z. Other project related area_____ [ ]

76. Highest education level attained by the project manager was:

a. Less than high school [ ]

b. High school [ ]

c. AA degree or two years of college [ ]

d. Between 2 and 4 years of college [ ]

e. BS/BA degree [ ]

f. Masters degree [ ]

g. Master degree plus 30 hours or doctoral candidate [ ]

h. PHD (or equivalent) [ ]

y. Did not have a project manager (added) [ ]

z. Other:_____ [ ]

77. If the project manager attended college, his major or speciality was:

a.	Computer Science	[ ]	f.	Business	[ ]
b.	Mathmatics	[ ]	g.	Liberal Arts	[ ]
c.	Engineering	[ ]	y.	Did not attend/ no project manager (added)	[ ]
d.	Physics (added)	[ ]			
e.	General Science (added)	[ ]	z.	Other:_____	[ ]

THE SOFTWARE DEVELOPMENT STAFF

78. List the number of positions authorized by category over the life of the project, and list next to that the actual number of individuals who occupied these positions (e.g., if one project manager position was designated, but during the course of the project that position was occupied by three individuals at different times the answer would be: [1] [3]).

	Position	A Authorized	B Occupied by
a.	Project manager	[ ]	[ ]
b.	Asst project manager (added)	[ ]	[ ]
c.	Functional analyst/[engineer] (added)	[ ]	[ ]
d.	Data processing analyst	[ ]	[ ]
e.	Programmer	[ ]	[ ]
f.	Support librarian	[ ]	[ ]
g.	Secretary	[ ]	[ ]
h.	Administrator	[ ]	[ ]
i.	User/Customer (if part of the development team)	[ ]	[ ]
y.	None (added)	[ ]	[ ]
z.	Other:_____	[ ]	[ ]

79. What was the source (by percent) of the programmer/analyst staff?

a. New hire from another company ____ %
b. New hire from school ____ %
c. Transfer from another project ____ %
d. Transfer from other than another project ____ %
e. ADP staff (added) ____ %
f. Subcontractor (added) ____ %
z. Other:_____ [ ]

80. At what level was the programmer support librarian?

a. Clerk/programmer technician [ ]
b. Junior programmer [ ]
c. Senior programmer [ ]
y. Did not use programming support librarian [ ]
z. Other:_____ [ ]

81. The chief programmers were:

a. Senior programmers [ ]
b. Functional area experts [ ]
c. Specially trained for task [ ]
y. Did not use chief programmers [ ]
z. Other:_____ [ ]

82. What was the education level of the programmer/analyst (by percent)?

a. Less than high school ____ %
b. High school ____ %
c. AA degree or two years of college ____ %
d. Between 2 and 4 years of college ____ %
e. BS/BA degree ____ %
f. Masters degree ____ %
g. Masters degree plus 30 hours or Doctorate candidate ____ %
h. PHD (or equivalent) ____ %
z. Other:_____ ____ %

83. What percent of the programmer/analyst staff were originally computer operators who moved directly from machine operation to programming? ____ %

84. Did these former operators make successful programmers? (originally narrative)

a. Yes, excellent [ ]

b. Yes, good/average [ ]

c. Yes, fair [ ]

d. No, poor [ ]

y. Did not use ex-operators as programmers [ ]

z. Comment:_____ [ ]

STAFF SUPPORT

85. Were the following services provided from within the project management resources, or supplied by a staff function within the company? (Indicate by inserting "W" for within the project resources, "O" for outside the project resources, ["B" for both]) (added)

a. Personnel _____

b. Accounting _____

c. Budgeting _____

d. Computer Operation _____

e. Travel Arrangement _____

f. Training _____

g. Typing _____

y. None (added) _____

z. Other:_____ _____

TRAINING

86. Was the project manager responsible for identifying training requirement of the development team members?

a. Yes [ ]

b. No [ ]

y. There was no training requirement or no project manager (added) [ ]

z. Other:_____ [ ]

87. Training requirements generated as a result of the project were satisfied from which of the following sources? (Insert 0 for methods/sources not employed and rank order the remaining methods/sources with 1 being the most important.)

a. On the job training _____

b. Classes conducted by project team members _____

c. Classes conducted by company cadre _____

d. Classes conducted by the system user _____

e. Classes conducted by independent training consultants _____

f. Classes conducted by hardware/software vendors _____

g. Classes conducted by colleges/universities _____

y. None (added) _____

z. Other: _____ _____

88. What percent of the personnel assigned to the project received additional training in the programming language selected? _____%

89. What percent of the personnel assigned to the project required additional training on the operating system that was used? _____%

GENERAL

90. If it were within your power to make any changes, or initiate any research in the area of staffing, what would you consider the most fruitful area for modification or study?

_____

_____

_____

_____

SECTION 6 - CONTROL

PROJECT CONTROL

91. Which of the following automated or manual systems were used for project control?

a. PERT [ ]
b. Modified PERT [ ]
c. [CPM] (corr) [ ]
d. GANTT Charts [ ]
e. CSCS (added) [ ]
f. WBS (added) [ ]
g. Graphs/Rate Charts (added) [ ]
h. Workloading [ ]
i. Milestone tracking [ ]
y. No project control [ ]
z. Other:_____ [ ]

92. Was a work breakdown structure code used in the control of system development?

a. Yes [ ]
b. No [ ]
z. Comment:_____ [ ]

REPORTING

93. Which manual reporting procedures were used in project monitoring and management? At what level did they originate, and how high did they go? How often were they aggregated, condensed, or edited as they moved through the chain?

	REPORT TITLE	A LOWEST ORIGINATOR	B HIGHEST RECIPIENT	C NO. OF AGGS/EDTS
a.	Weekly/monthly Activity			
b.	Project Status			
c.	Significant Chg			
d.	Cost vs Performance (added)			
e.	_____			
f.	_____			
y.	None/Unknown (added)			
z.	Other:_____			

94. Which automated reporting systems were used in project monitoring and management?

		A LOWEST ORIGINATOR	B HIGHEST RECIPIENT
a.	Manhour by Activity (e.g., code, flow diagram, etc.)	_____	_____
b.	Manday by Task (e.g., prepare users guide, design data base, etc.)	_____	_____
c.	None/Unknown	_____	_____
z.	Other:_____	_____	_____

95. In monitoring system development, system software was used to;

a. Count compiles per module [ ]
b. Count lines of code produced [ ]
c. Check for adherence to coding conventions [ ]
d. Check for use of standard data element names [ ]
e. Perform manhour/cost accounting (added) [ ]
f. Check performance (added) [ ]
g. Monitor changes (added) [ ]
y. Did not use software to monitor system development [ ]
z. Other:_____ [ ]

96. List productivity indexes such as lines of code, program errors, sources of errors, turn arounds required per completed task, etc., that were employed in monitoring performance. (Originally narrative)

a. Lines of code (per unit of time) [ ]
b. Modules compiled (per unit of time) [ ]
c. Program errors [ ]
d. Computer time used [ ]
e. Documented pages [ ]
y. Did not use productivity indexes [ ]
z. Other:_____ [ ]

97. Specific standards employed during the course of the project were developed, adapted, or directed by:

	Standard	A Project Manager	B Company	C User	D Was None
a.	Data names	[ ]	[ ]	[ ]	[ ]
b.	Coding	[ ]	[ ]	[ ]	[ ]
c.	Programming	[ ]	[ ]	[ ]	[ ]
d.	Documentation	[ ]	[ ]	[ ]	[ ]
e.	Testing	[ ]	[ ]	[ ]	[ ]
f.	Management report	[ ]	[ ]	[ ]	[ ]
g.	Configuration control (added)	[ ]	[ ]	[ ]	[ ]
h.	Quality assurance (added)	[ ]	[ ]	[ ]	[ ]
y.	No standards (added)	[ ]	[ ]	[ ]	[ ]
z.	Other:_____	[ ]	[ ]	[ ]	[ ]

98. Which of the following were recognized as distinct phases in the development effort? [AFR 300-15, 1978]

a.	System definition	[ ]
b.	Requirements definition	[ ]
c.	Preliminary design (added)	[ ]
d.	Detail design (added)	[ ]
e.	System design	[ ]
f.	Module design	[ ]
g.	Coding	[ ]
h.	Module test	[ ]
i.	Subsystem integration	[ ]
j.	System integration	[ ]
k.	System test	[ ]
l.	Acceptance (added)	[ ]
m.	Validation (added)	[ ]
n.	Operation	[ ]
o.	Maintenance (added)	[ ]
y.	Development was not divided into [recognized] phases (added)	[ ]
z.	Other:_____	[ ]

ASSIGNMENT OF WORK

99. Task assignment.

Action	Frequency	ALWAYS	MOST OF THE TIME	ABOUT 1/2 OF TIME	LESS THAN 1/2 OF TIME	SELDOM	NEVER
a.	Were task assignments to the project teams given in writing?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
b.	Were required completion dates included with each written team task assignment?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
c.	Were written team task assignments prepared in such a way that the relationship of the task to the next higher level task was clearly delineated?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
d.	Were task assignments given to individual team members in writing?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
e.	Were required completion dates included with each individual team member's written task assignment?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
f.	Were individual team members written task assignments prepared in such a way that the relationship of the task to the next higher level task was clearly delineated?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
y.	No Team (added)						[ ]
z.	Comment: _____						[ ]
	_____						

100. Were task work time estimates provided at the time of task assignment or did individual team members provide time estimates after reviewing this assignment?

a. Time and task assigned [ ]

b. Time and task assigned with verification or modification of time allotted being provided by individual team member as a matter of procedure [ ]

c. Individual team member provided the time estimate for each task assigned [ ]

y. No effort was made to determine time requirements for individual tasks [ ]

z. Other:_____ [ ]

_____

101. At what intervals were task assignments made to individual team members?

a. Every 5 work days [ ]

b. Every 10 work days [ ]

c. Every month [ ]

d. As tasks were developed and defined [ ]

e. As resources became available to work on the task [ ]

y. Task assignment not made to individual team members (added) [ ]

z. Other:_____ [ ]

102. Were procedures used in which programmers or analysts bid on specific tasks in the development projects (e.g., "I'll write the edit program for $1,217.12")?

a. Yes [ ]

b. No [ ]

z. Comment:_____ [ ]

103. If bidding as described above was employed, how successful was it?

a. Very [ ]

b. Moderately [ ]

c. Unsuccessful [ ]

y. Not employed [ ]

z. Useful only under the following condition(s) [ ]

_____

FORMAL REVIEWS

104. The following formal reviews were conducted as a requirement of the software development effort. [AFR 300-15, 1978]

a. Systems requirements review [ ]

b. Systems design review [ ]

c. Preliminary design review [ ]

d. Critical design review [ ]

e. Formal qualifications review [ ]

y. No formal reviews were conducted [ ]

z. Other:_____ [ ]

105. CONCERNING REVIEWS

Action	Frequency	ALWAYS	MOST OF THE TIME	ABOUT 1/2 OF TIME	LESS THAN 1/2 OF TIME	SELDOM	NEVER
a.	Was formal documentation provided in advance of each review?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
b.	Did reviews take place on schedule?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
c.	Were the review proceedings formally documented?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
d.	Did top management attend formal reviews?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
e.	Did the customer/user attend formal reviews?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
f.	Was an independent review team used (independent of project manager)?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
g.	Did the project manager attend the formal reviews?	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

h. What was the title, position and affiliation of the chairperson of the formal reviews?_____

_____

y. There were no formal reviews (added) [ ]

CONFIGURATION MANAGEMENT

106. Was a software configuration management system employed?

a. Yes (give title/name:_____) [ ]

b. No [ ]

z. Comment:_____ [ ]

107. The system was base lined after: [AFR 300-15, 1978]

a. System requirements review [ ]

b. System design review [ ]

c. Preliminary design review [ ]

d. Critical design review [ ]

y. Did not base line system (added) [ ]

z. Other:_____ [ ]

108. Were formal configuration control boards employed?

a. Yes [ ]

b. No [ ]

z. Comment:_____ [ ]

109. Give title, position and affiliation of chairperson of [software] Configuration Control Board. (added)_____

_____

INFORMAL REVIEWS AND WALK-THROUGHS

110. How often were "informal" reviews conducted between the project manager and his supervisor?

a. Daily [ ]

b. Weekly [ ]

c. Monthly [ ]

d. As required [ ]

y. There were no informal reviews [ ]

z. Other:_____ [ ]

111. Walk-throughs [as defined by Weinberg, 1971] were used for:

a. Design reviews [ ]

b. Coding reviews [ ]

y. Did not use walk-throughs [ ]

z. Other:_____ [ ]

112. How often were walk-throughs scheduled?

a.	Daily	[ ]	d.	As required	[ ]
b.	Weekly	[ ]	y.	Not used	[ ]
c.	Monthly	[ ]	z.	Other:_____	[ ]

113. Who normally attended walk-throughs?

		A DESIGN	B CODING	C OTHER
a.	Peer Programmers or analysts	[ ]	[ ]	[ ]
b.	Programmer or analyst trainees	[ ]	[ ]	[ ]
c.	Programmer or analyst's supervisor	[ ]	[ ]	[ ]
d.	Project manager	[ ]	[ ]	[ ]
e.	Standards monitor	[ ]	[ ]	[ ]
f.	Top level manager	[ ]	[ ]	[ ]
g.	User/customer	[ ]	[ ]	[ ]
h.	Quality Assurance (added)	[ ]	[ ]	[ ]
i.	Lead/System engineer (added)	[ ]	[ ]	[ ]
j.	Test personnel (added)	[ ]	[ ]	[ ]
y.	Did not use walk-throughs	[ ]	[ ]	[ ]
z.	Other:_____	[ ]	[ ]	[ ]

_____

114. Were walk-through minutes/records kept?

		A DESIGN	B CODING	C OTHER
a.	Yes	[ ]	[ ]	[ ]
b.	No	[ ]	[ ]	[ ]
y.	Walk-throughs not used	[ ]	[ ]	[ ]
z.	Other:_____	[ ]	[ ]	[ ]

GENERAL

115. If it were within your power to make any changes in the method or procedures followed in controlling this project what would these changes be, or, if you had resources available to undertake research in the area of planning, which aspect would you explore?

_____

_____

_____

_____

SECTION 7 - DIRECTING/MONITORING

RESPONSIBILITY AND AUTHORITY OF THE PROJECT MANAGER

116. Enter the number of positions (by category described) directly involved in this development project.

a. Full time, report to project manager_____.

b. Full time, report outside project manager's orgn_____.

c. Full time, outside contractor/consultant_____.

d. Full time, customer_____.

e. Part time, report to project manager_____.

f. Part time, report outside project manager's orgn_____.

g. Part time, outside contractor/consultant_____.

h. Part time, customer_____.

117. The project manager was responsible for:

a. Technical quality [ ]

b. Hire and fire assigned personnel (within firm policy) [ ]

c. Evaluate performance of individual personnel [ ]

d. Administration, budget, etc. [ ]

e. Allocating computer resources [ ]

f. Allocating non-computer resources [ ]

g. Meeting schedule commitments [ ]

h. Negotiating specification changes with customer [ ]

i. Making a profit (i.e., operating within a budget) [ ]

z. Other:_____ [ ]

118. The title and position of the project manager's supervisor was:

_____

_____

119. The span of control of the project manager's supervisor (including the project manager) was_____persons.

120. The title, position, and number of people reporting directly to the project manager was:

	A TITLE	B POSITION	C NUMBER
a.	_____	_____	_____
b.	_____	_____	_____
c.	_____	_____	_____
d.	_____	_____	_____
e.	_____	_____	_____
f.	_____	_____	_____
g.	Project manager's span of control is _____ persons.		
y.	None/Unknown (added)	[ ]	[ ]

121. Indicate the reviews the project manager attended and the capacity in which he attended.

		A Reviewer	B Reviewee	C Observer
a.	Formal [management] reviews (added)	[ ]	[ ]	[ ]
b.	Walk-throughs	[ ]	[ ]	[ ]
c.	Budget reviews (added)	[ ]	[ ]	[ ]
d.	Technical reviews (added)	[ ]	[ ]	[ ]
y.	Did not attend/there were no reviews (added)	[ ]	[ ]	[ ]
z.	Other: _____	[ ]	[ ]	[ ]

122. The project manager was expected [by corporate management] to be: (added)

a.	A technical supervisor	[ ]
b.	A non-technical supervisor	[ ]
c.	Project administrator [only] (added)	[ ]
y.	None of the above (added)	[ ]
z.	Comment: _____	[ ]

MANAGEMENT AND MANAGEMENT TECHNIQUES

123. In the conduct of this project did the company or project manager make a conscious effort to apply any of the following management techniques?

		A Company	B Proj Mgr
a.	Management by objectives [Drucker, 1954]	[ ]	[ ]
b.	Job enrichment [Herzberg, 1977]	[ ]	[ ]
c.	[Motivation] theories [Maslow, 1943] (corr)	[ ]	[ ]
d.	Suggestion program	[ ]	[ ]
e.	Incentive and/or bonus program	[ ]	[ ]
f.	Participative management	[ ]	[ ]
g.	Management by exception	[ ]	[ ]
y.	None of the above (added)	[ ]	[ ]
z.	Others:_____	[ ]	[ ]

124. In using management by objectives the objectives were:

a. Set by the project manager without input from the team member [ ]

b. Set by the project manager with input from the team member [ ]

c. Periodically reviewed [ ]

y. Did not use management by objectives [ ]

z. Comment:_____ [ ]

125. The project manager:

a. Issued instructions to his subordinates in writing [ ]

b. Delegated technical decisions to his direct subordinates (Team chiefs) [ ]

c. Had an "open door" policy [ ]

d. Employed quality standards defining what was expected of each programmer/analyst [ ]

e. Employed quantity standards defining how much each programmer/analyst should accomplish [ ]

f. Monitored progress with the aid of a control board and/or control room [ ]

g. Had a separate office to insure privacy [ ]

h. Had a personal secretary [ ]

126. How did the union contract affect the responsibility and authority of the project manager?

a. Limited his ability to hire and fire his staff [ ]

b. Required clearance from the union prior to taking certain management actions [ ]

c. Union helped motivate team personnel toward better performance [ ]

d. Union labor standards retarded the project managers authority [ ]

f. Union labor standards enhanced production [ ]

g. Union labor standards retarded production [ ]

h. Union membership had no recognizable affect on the project [ ]

y. No team members were represented by a union [ ]

z. Other:_____ [ ]

GENERAL

127. If you had it within your power to implement changes in the way this project was directed, or had the resources to devote to research in this area, what action would you take?

_____

_____

_____

SECTION 8 - DELIVERABLES AND SUCCESSES

INTRODUCTION. This section of the survey presupposes that the project being reported on is complete or very nearly complete. The following question tests this supposition and provides qualifying data for the remaining inquiries.

128. This project is:

a. 50% complete or less [ ]

b. 51% to 75% complete [ ]

c. 76% to 90% complete [ ]

d. 91% to 98% complete [ ]

e. 99% to 99.99% complete [ ]

f. 100% complete and accepted by customer [ ]

y. Cancelled/not deliverable (added) [ ]

z. Comment:_____ [ ]

Rather than provide two sets of questions we ask you to restructure the question in your mind to relate them to present project status. In the question: "Was the project completed on or before schedule?" could be read "will the project be completed on or before schedule?" and the degree of forecast derived from your just stated position on the development continuum.

MEETS SCHEDULE

129. Was the project completed on or before schedule?

a. Yes on schedule [ ]

b. Yes,_____months early, _____% early [ ]

c. No,_____months late, _____% late [ ]

d. Yes, however specifications were reduced (added) [ ]

y. Project not completed and/or no estimate available (added) [ ]

z. Other:_____ [ ]

130. If not completed on time what was the major cause of slippage [/cancellation]? (added)

a. Change in requirement [ ]

b. Change in method of design [ ]

c. Bad initial estimate

d. Unreasonable estimate, by either top management or the customer [ ]

e. Limited authority over resources [ ]

f. Excessive absences on the part of the project team members [ ]

g. Poor management (added) [ ]

y. Project was completed or is on schedule (added) [ ]

z. Other:_____ [ ]

132. If project was late, what portion (in percent is attributable to change in requirements? _____%

133. What, if anything, could the project manager have done to improve his ability to meet the schedule? (Originally narrative)

a. Restrict the number of changes [ ]

b. Require formal system of changes [ ]

c. Require a firm requirements baseline [ ]

d. Conduct more reviews [ ]

e. Receive more authority over project [ ]

f. Made a better estimate of schedule [ ]

g. Perform better planning [ ]

h. Nothing [ ]

i. Better direction and control [ ]

j. Better and earlier requirement specifications [ ]

y. Project was completed or is on schedule [ ]

z. Other:_____ [ ]

MEETS COST

134. Was the project delivered within the original budget?

a. Yes, on cost [ ]

b. Yes, $_____under cost, _____% under cost [ ]

c. No, $_____over cost, _____% over cost [ ]

d. Yes, however specifications were reduced (added) [ ]

y. Project not completed and/or no estimate available (added) [ ]

z. Other:_____ [ ]

135. If not completed within the original budget, what was the cause of this slippage [/cancellation]? (added)

a. Change in requirements [ ]

b. Change in method of design [ ]

c. Bad initial estimate [ ]

d. Unreasonable estimate, by either the manager or the customer [ ]

e. Limited authority over resources [ ]

f. Excessive absences on the part of the project team members [ ]

g. Poor management (added) [ ]

y. Project was completed or is within cost (added) [ ]

z. Other:_____ [ ]

136. If project exceeded cost estimates, what portion of the overrun (in percent) was caused by a change in requirements? _____%

137. What, if anything, could the program manager have done to improve his ability to meet the budget? (Originally narrative)

a. Restrict the number of changes [ ]

b. Require formal system of changes [ ]

c. Require a firm requirements baseline [ ]

d. Conduct more reviews [ ]

e. Receive more authority over project [ ]

f. Made a better estimate of costs [ ]

g. Perform better planning [ ]

h. Nothing [ ]

i. Better direction and control [ ]

j. Better and earlier requirement specifications [ ]

y. Project was completed or is within cost [ ]

z. Other:_____ [ ]

MEETS REQUIREMENTS

138. Did the delivered software meet the requirements as originally specified by the customer?

a. Yes [ ]

b. No [ ]

y. No requirements specified [and/or project not completed] (added) [ ]

z. Other:_____ [ ]

139. Did the customer accept the delivered system as meeting specified requirements in total, or did he identify exceptions?

a. Accepted system in total as meeting specified requirements [ ]

b. Identified exceptions [ ]

y. No requirements specified [and/or project not completed] [ ]

z. Other:_____ [ ]

140. How was it determined that the system met the requirements specified? (Originally narrative)

a. Qualification/field test [ ]

b. System in operation [ ]

c. Formal system/acceptance test [ ]

d. Independent verification and validation [ ]

e. Check against known answers [ ]

f. Simulation [ ]

g. System did not meet requirement specified [ ]

y. No requirements specified and/or project not completed [ ]

z. Comment:_____ [ ]

141. Why did the system not meet the required specification? (Originally narrative)

a. Requirements changed [ ]

b. Initial estimate bad [ ]

c. Requirements ignored/customer accepted without correction (added) [ ]

d. System met requirements specified [ ]

y. No requirements specified and/or project not completed [ ]

z. Comment:_____ [ ]

MEETS RELIABILITY STANDARDS

142. Did the delivered software meet the reliability standards originally specified?

a. Yes [ ]

b. No [ ]

y. No standards specified [and/or project not completed] (added) [ ]

z. Comment:_____ [ ]

143. Why did the delivered software fail to meet the reliability standards?

a. Requirements changed (added) [ ]

b. Not enough reviews and testing (added) [ ]

c. _____ [ ]

d. System met the specified reliability standards [ ]

y. No standards specified [and/or project not completed] (added) [ ]

z. Comment:_____ [ ]

144. Which, if any, of the following methods of measuring reliability of the delivered software system were used in the project? [Gilb, 1977]

a. The finished system was "salted" with known bugs (after integration testing and before sign off). The system was then debugged for a fixed (given) period of time after which the ratio of found known bugs to found unknown bugs was judged equal to the ratio of unfound known bugs to unfound unknown bugs. [ ]

b. Curves of errors found to time spent debugging were calculated. [ ]

c. A software reliability error prediction model was employed. [ ]

d. Special test drivers were employed to stress system (added). [ ]

e. Reported errors per unit of time (MTBF) and system accepted when error r . reached acceptable level (added). [ ]

y. No reliability measuring method was employed [and/or project not completed] (added). [ ]

z. Other:_____ [ ]

_____

_____

MEETS RELIABILITY STANDARDS

145. Did the delivered software meet the maintainability standards originally specified?

a. Yes [ ]

b. No [ ]

y. No standards specified and/or project not completed (added) [ ]

z. Comment:_____ [ ]

146. Why did the delivered software fail to meet the maintainability standards?

a. _____ [ ]

b. _____ [ ]

c. _____ [ ]

d. Software met the specified maintainability standards [ ]

y. No standards specified [and/or project not completed] (added) [ ]

z. Comment:_____ [ ]

147. Which, if any, of the following methods of measuring the maintainability of the delivered software were used in the project? [Gilb, 1977]

a. Measured the time to repair the first "N" number of bugs reported (after integration testing and just before sign off). The average time to find a bug became the mean time to repair (MTTR). [ ]

b. "Salted" the finished code with known bugs. The average time to find and repair the known bugs became the mean time to repair (MTTR). [ ]

c. Cost to maintain program per unit of time and accepted when cost reached an acceptable level (added) [ ]

y. No maintainability measures were employed and/or project not completed (added) [ ]

z. Other:_____ [ ]

_____

MEETS USABILITY REQUIREMENTS

148. Was the delivered system usable? If so, how was this determination made? (Originally narrative)

a. Yes, system is in production [ ]

b. Yes, system is in use [ ]

c. Yes, independent verification and validation [ ]

d. Yes, field or qualification testing [ ]

e. Yes, customer was satisfied [ ]

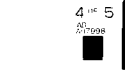
f. Unknown, has not been determined [ ]

g. No, user was not satisfied [ ]

y. No, the system was not delivered/cancelled [ ]

z. Other:_____ [ ]

AD-A117 998 SACRAMENTO AIR LOGISTICS CENTER MCCLELLAN AFB CA SERV--ETC F/G 22/2
RESULTS OF A SURVEY SOFTWARE DEVELOPMENT PROJECT MANAGEMENT IN --ETC(U)
DEC 79 R H THAYER, J H LEHMAN
UNCLASSIFIED SM-ALC/MME-TR-79-54-VOL-2 NL



GENERAL

149. What was the period of the final product warranty?

a. 1 year [ ]
b. 2 years [ ]
c. 3-5 years [ ]
d. 6 or more years [ ]
y. No warranty [ ]
z. Other:_____ [ ]

150. What was the approximate production rate (lines of code per day) for the entire project?

a. Average programmer/analyst _____
b. Best programmer/analyst _____
c. Worst programmer/analyst _____
z. Comment:_____ [ ]

151. How many lines of code were produced per page of documentation?

152. What was the cost per line of code? $_____

153. Was software development the pacing factor (critical path) on the project?

a. Yes, hardware was developed ahead of software [ ]
b. No, software was developed ahead of hardware [ ]
c. Yes, project was almost all software [ ]
d. No, hardware and software delivered together (added) [ ]
e. Varied, hardware and software alternated (added) [ ]
y. Project not completed/there was no pacing factor (added) [ ]
z. Other:_____ [ ]

154. What percent of production [calendar time] was spent in the following areas? (added)

a. Requirement specification _____%
b. Preliminary design _____%
c. Detail design _____%
d. Programming/unit testing _____%
e. Integration testing _____%
f. System testing _____%
y. Project not completed (added) [ ]
z. Comment:_____ [ ]

155. If the project used on-line, interactive programming for program development, was it:

a. A highly effective development tool [ ]

b. Effective in some cases [ ]

c. Of limited utility [ ]

d. A drain on hardware resources [ ]

e. A nice toy [ ]

y. On-line, interactive program was not used/unknown [ ]

z. Other:_____ [ ]

156. If your experience reflects that on-line, interactive programming was an effective tool, in which situation was it most effective? (Check or rank order)

a. During development of code [ ]

b. To try short length of code for possible use (simulation approach) [ ]

c. During debugging [ ]

d. During testing [ ]

e. Not an effective tool [ ]

y. Did not use on-line, interactive programming/unknown [ ]

z. Other:_____ [ ]

157. If your experience reflects that on-line, interactive programming was an effective tool what do you feel the improvement in programmer productivity over conventional (batch) software development was?

a. Not an improvement [ ]

b. 1.5:1 improvement [ ]

c. 2:1 improvement [ ]

d. 3:1 improvement [ ]

e. 5:1 improvement [ ]

y. Did not use on-line, interactive programming/unknown [ ]

z. Other:_____ [ ]

158. Overall, how well do you think that this project met the project managers major goals: to deliver on time, within budget, and meeting the requirement of the system, where the final software product is reliable, maintainable, and usable?

a.	Extremely well	[ ]	e.	Poor	[ ]
b.	Very well	[ ]	f.	Failed	[ ]
c.	Good	[ ]	z.	Other:_____	[ ]
d.	Fair	[ ]		_____	

159. Give some lessons learned from this project.

_____

_____

_____

_____

_____

_____

INTRODUCTION. This part of the survey contains questions that are general in nature and pertain to software development projects as a whole, and were designed to be answered by the project manager.

(These questions were originally 1, 2, 3, 4, and 25 of Section Three)

160. Place the following objectives of a project manager in order of importance. (Enter number 1 through 6 in the space provided) The project should:

a.	Be within budget	[ ]	f.	Be usable	[ ]
b.	Be on schedule	[ ]	g.	Depends on contract incentive (added)	[ ]
c.	Meets requirements	[ ]			
d.	Be maintainable	[ ]	h.	Varies with job (added)	[ ]
e.	Be reliable	[ ]			

161. It is reported in literature that: 1 support librarian, plus 2 programmers can do the work of 3 programmers. Do you believe this?

a.	Yes	[ ]
b.	No	[ ]
c.	Do not know, insufficient data/experience (added)	[ ]
z.	Other:_____	[ ]

162. If you believe the support librarian does relieve the programmer/analyst of unnecessary tasks, but do not believe the ration is 2 to 1, what ratio do you consider more accurate?

a.	1 to 1	[ ]	f.	Varies, according to skill level (added)	[ ]
b.	3 to 1	[ ]			
c.	4 to 1	[ ]	g.	Do not believe/do not know (added)	[ ]
d.	5 to 1	[ ]			
			y.	Believe 2 to 1	[ ]
e.	10 to 1	[ ]			
			z.	Other:_____	[ ]

163. What actions are customarily taken by the project manager when it is discovered that a project is behind schedule?

a.	Wring hands	[ ]
b.	Assign more personnel to the project	[ ]
c.	Renegotiate schedule with customer	[ ]
d.	Renegotiate schedule with manager	[ ]
e.	Quit	[ ]
f.	Say nothing to top management hoping to make up schedule time	[ ]

g. Reduce projects goals (added) [ ]

h. Realign manpower (added) [ ]

i. Use overtime (added) [ ]

j. Replan the project (added) [ ]

k. Varies, depends on situation (added) [ ]

y. Nothing (added) [ ]

z. Other:_____ [ ]

164. Please furnish any additional comments or statement concerning this survey or the science of software engineering project management.

_____

_____

_____

_____

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APPENDIX C
COMMENTS ON AND ABBREVIATIONS USED IN THE REDUCTION OF ANSWERS

INTRODUCTION

The purpose of this Appendix is to present comments on specific questions, relationships between questions and their answers, procedures used in contriving missing answers, and to list and describe the abbreviations and codes used in this report. In addition, since a few of the questions were poorly written and/or in general misunderstood, some comments along these lines will also be reported here.

To conserve space and to provide a means of using a computer for analysis, all answers were abbreviated and/or coded (abbreviations and codes will be called just codes for the balance of this report). Because of space limitations and to assist in ease of processing, all alpha-numeric codes were restricted to exactly three characters. The use of codes also had an additional advantage; it effectively disguised the answers so that the participants continue to remain anonymous.

The authors did not comment on all the questions and answers. If the authors have a comment, discussion, or observation on a question, their comments immediately follow the question number. Codes will immediately follow comments. If there are no comments, the codes will follow the question number. If the authors have no comment or codes concerning a given question, the question number will be passed by.

Four types of codes were used. The first type was general, applies to all questions, and will be defined after this introductory section. The second type was applicable to only one answer and appears after the question number in this section. The third type of code was general across two or more questions (e.g., FOR for FORTRAN; GPC for general purpose computer), and was listed once the first time it is used. Therefore, all Type Two and Three codes were defined after the question number in which they first appear. The code was separated from its explanation by a dash (--).

The fourth code type applied to questions 33, 51, 52, 67, 68, 90, 115, 127, 159 and 164 only. These questions were strictly narrative in nature

and did not lend themselves to multiple choice. To code these questions, all narrative sentences were broken into phrases generally containing a verb and object. These phrases were then given a code. The codes indicate whether the phrase concerned a planning, organizational, staffing, control, etc., function.

The authors attempted to use codes that were easy to recognize (mnemonic) to reduce the amount of flipping between appendixes.

The letters a through z indicated the sub-parts of the questionnaire. Parts a through w were general questions. Part x was used to indicate the entire question was not answered (ie., skipped). Part y was used primarily to show "none" of the answers applied or the questions were "not applicable". Part z was used for "other" answers.

TYPE ONE CODES

The code "YES" on the listing opposite a question (Sub-parts a through w) indicated that the surveyee "checked" the answer without comment and the answer is "yes" or "true". If a given question has a "blank" for an answer this indicates that the surveyee answered "no", or that the answer is "false" (this cannot be assumed if the surveyee did not answer at least one part in a multiple-part question).

Sometimes a pseudo question, Sub-part x, was created to indicate that the surveyee did not provide an answer to a given question because he: 1) did not understand the question, 2) felt it did not apply to his project or organization, or 3) just did not feel like answering it. This was done so that the reader would not read a "no" when the correct answer was unknown to the authors. Sometimes the surveyee wrote in "unknown" otherwise it was coded "MIS" by the authors.

When answered, Sub-part y was coded "NON" to mean that the whole question was answered "no" or "none". The answer to Sub-part y was frequently supplied by the authors, therefore, one of the "C" codes was used (see later discussion). Sub-part z was coded "OTH" to mean that the surveyee wrote in another answer and the authors were not able to use it any other way (see discussion Appendix B).

As an added note, answers to Sub-parts a through w and z, Sub-part x and Sub-part y are mutually exclusive.

Several of the questions are multi-part. It is assumed that if a surveyee answered any one part of the multi-part question "yes" or "true" then all parts of the questions were answered. Any answers that were not checked were "no" or "false".

Other Type One codes are listed below. These codes were frequently used when the surveyee did not answer a question but made some comment in the margin. Other times these codes were used as the appropriate answer to a narrative question.

CFU -- Confusing, vague, don't understand

DEL -- Deleted by authors as revealing the participant

DIS -- Disagree with question as written, not true statement

D/K -- Don't know

INF -- Infinite, continuous

N/A -- Not applicable (on this project), didn't use

NEG -- Negative, non-contributary

NON -- No, none, or false

NOS -- No solution (yet), hard to solve

N/S -- Not specified/not selected

OTH -- Other

UNK -- Unknown (also included "?" as an answer)

VAR -- Variable

MIS -- Question not answered (supplied by authors)

YES -- Yes or true

Upon occasion the authors felt it necessary to either answer the question for the surveyee, or change his answer. In the interest of honest reporting, the following codes indicate whether or not the answer was changed/contrived and the reason. These change codes were C01, C02, C03, and C04. C01 has the highest probability that the changed answers reflect the true answer, C02 next highest probability, C03 next, and C04 the lowest probability.

The change codes follow:

C01 -- This answer was supplied by the authors and the answer chosen was based on an answer to a different question, e.g., if the surveyee answered Question 3 with any answer but c, and he did not answer Question 4, answer 4y was provided by the authors as C01. Again, if the surveyee answered Question 46A but not 46B, answer 46By was coded C01 by the authors.

C02 -- These answers were manufactured by the authors by compartmentalizing answers provided originally in narrative form, i.e., multiple choice answers were formulated after all the answers were supplied by the participants. These answers were originally in narrative type questions or answers provided under "comments" or "other." An exception to this was when the participant wrote in "none" or another negative comment because a "none of the above" type answer was not supplied by the authors. When this happens a "none" answer is manufactured but coded C01.

C03 -- These answers redirected by the authors from the one given by the surveyees as "other" or "comment" to one of the existing answers which the authors felt was equally as good as the one placed in "comment", e.g., in Question 2 one of the answers placed under "other" was "airborne computer." The authors deleted the "other" answer and substituted code C03 in answer 2e. This was done to reduce the number of possible answers while still retaining as much

accuracy as possible. C03 was also used to answer a question that was redundant, i.e., the question appeared more than one time and was only answered once. The unanswered question was answered by the authors as C03, e.g., if Question 34e was checked but 55a was not, answer 55a was coded C03 by the authors.

C04 -- These answers were redirected by the authors from a supplied answer to another answer. This was only done with utmost caution. It was done only if the supplied answer was not reasonable and there was reason to believe it was incorrect.

TYPE TWO AND TYPE THREE CODES

These Sections reflect the specific codes and comments concerned with each question and are ordered by the question number. If there is no code or comment necessary for a given question, it is skipped.

SECTION 1 - PROJECT IDENTIFICATION

3-4. Question 4 is dependent on Question 3. If the participant answered Question 3a, b, or z and did not answer Question 4, answer 4y was coded C01.

5-12. Questions 6 through 9 are dependent on the answer to Question 5. If Question 5 was answered 5c through 5z (any or all) and Questions 6, 7, 8 or 9 were not answered, answer y was coded C01. Questions 10 through 12 are also dependent on the answers to Question 5. If Question 5 was answered 5a and/or 5b and Questions 10, 11 or 12 were not answered, answer y was coded C01.

8. Answers to Question 8a were divided into a1, a2, a3, and a4. Answers to Question 8b were divided into b1, b2, b3, and b4. Answers a3, a4, b3 and b4 were only used if two machines and/or operating systems were reported.

The following codes were used for answers 8a1, 8a3, 8b1, and 8b3 (manufacturer) if the manufacturer was given:

CDC -- Control Data Corporation

DEC -- Digital Equipment Corporation

GEC -- General Electric Corporation

HCS -- Harris Computer Systems

HIS -- Honeywell Information Systems

HPK -- Hewlett-Packard Corporation

IPM -- International Business Machines

INH -- In-house

LIT -- Litton Corporation

SDC -- Systems Development Corporation

SEL -- System Engineering Laboratory

UNI -- Sperry-Univac Corporation

ZER -- XEROX Corporation

The following code was used for Answers 8a2 and 8a4 (computer make and model) if the computer type was given:

GP# -- Number which follows "GP" was taken from the size class numbers reported under "General Purpose Computer Census", Computer-World (Jun 1978), a copy which follows this appendix.

The following codes were used for Answers 8a2 and 8a4 (computer make and model) if the computer type was not given or the code did not appear in the "General Purpose Computer Census":

GMI -- General purpose, mini-computer

SLG -- Special purpose, large computer

SMI -- Special purpose, mini-computer

The following codes were used for Answers 8b2 and 8b4 (type operating systems) if the type operating system was given. Many of the answers were abbreviated and not always completely understood by the authors. Answers are given as reported:

DVS -- DOSVS

GCO -- GCOS (GECOS)

IMS -- IMS

OSM -- OSMNT

OVT -- OSMVT

RPM -- RPM

RSX -- RSX

RTE -- RTE

RTM -- RTM

SCO -- SCOPE

SVS -- SYSIMS

SYM -- SYMON

SYS -- SYS II

The following codes were used for Answer 8b2 and 8b4 (type operating systems) if the name of the operating system was not given:

GOS -- General purpose operating system

SOS -- Special purpose (one of a kind) operating system

9. The codes used for the answers to this question were the same as for Question 8.

12. The codes used for the answers to this question were the same as for Question 8.

15. This question was not always clear to the participants. It was not clear to the participants how "one user at multiple locations" should be answered and their answer was written under "comments". The authors selected Answer 15b as being appropriate and coded it C03.

13, 16-17. Questions 13, 16, and 17 are related. Some participants checked 16e for an in-house project (Answer 13a or 13b), others wrote "none" under "Other", and other participants left the question blank. Therefore, the authors elected to insert a new answer, 16y, and coded it C01 if Question 16 was blank and the project was for an in-house customer.

If Question 16 was answered other than 16c and 16g and Question 17 was not, answer 17y was coded C01. The following code was used for answer 17c:

COM -- Comparison of output results against known answers.

18. The total cost of the project was reported in dollars according to the following method. The cost $ d(1) d(2) d(3) ... d(N) can be represented by d(1) d(2) X 10**R where R=N-2 and was coded on the listing as d(1) d(2) R.

19. The total cost of the software was reported using the same method as in Question 18.

20. The project's beginning and ending was expressed in months and years, with the beginning month being a number from 001 to 012 as answer a and the beginning year being the last two digits of the year as answer b; the ending month being a number from 001 to 012 as answer c and the ending year being the last two digits of the year as answer d. If the month was not given, Jun (006) was assumed.

22. The lines of source codes were reported using the same method as in Question 18.

24. The size of the data base was reported in words or bytes using the same method as in Question 18.

SECTION 2 - REQUIREMENT SPECIFICATIONS,

INPUT CONDITIONS, AND ENVIRONMENT

25-30. Questions 25 through 30 are related. If Questions 25 through 30 generally indicated that requirement specifications were not prepared and Questions 25 through 30 were not answered, answer y was coded C03 (or N/A for Question 27).

26. If Question 25 was answered 25a and Question 26 was not answered, answer 26c was coded C01. If Question 25 was answered 25b or 25d through 25z and Question 26 was not answered, answer 26y was coded C01 or C03.

29. If Question 28 was answered 28b or 28y and Question 29 was not answered, answer 29y was coded C01 or C03.

30. Participants did not generally satisfactorily answer, nor apparently understand, Question 30d. However, if Question 30d was answered the code was used:

PDL -- Programming Design Language

31. Question 31 did not originally have a "Documentation not required" answer. Therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 31 blank, answer 31y was coded C03.

32. Question 32 did not originally have a "Customer did not specify" answer. Therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 32 blank, answer 32y was coded C03.

The codes to answer Question 32a1 and 32a2 was the same as for Question 8. Answers 32a3 and 32a4 were only used if two machines were reported.

The code to answer Question 32b was reported using the same method as in Question 18. Other codes were:

Percent number (%) -- percent of core used at specified time in development cycle (usually Critical Design Review).

PCT -- Percent used (unit unspecified).

The code to answer Question 32c was indicated in time to respond. Response time was reported in seconds using the same method as in Question 18, except the second position can be a minus sign for negative exponential.

Other codes were:

Percent Number (%) -- percent of available execution time

PCT -- Percent used (unit unspecified)

RTS -- Real time system

SRT -- System response or execution time (unit unspecified).

The following codes were used to answer Question 32d1. Answer to 32d2 was used only if two languages are reported.

AP1 -- AP-101

ASS -- Unspecified Assembler

CM1 -- CMS-2

FOR -- FORTRAN

HAL -- HAL/1

JOV -- JOVIAL

PL1 -- PL/1

TAC -- TAC POL/TAC MOL

The following code was used to answer Question 32p.

Number -- Number of paragraph modified.

The following codes were used to answer Question 32v.

CCR -- Critical component reliability only

HWR -- Hardware reliability specified only

MTB -- Mean time between failures

SAV -- Software system availability (up time)

SET -- Software evaluation testing

TSR -- Total system reliability/available.

The following codes were used to answer Question 32aa.

Number -- Time in months

BOA -- Basic ordering agreement.

33. Codes for Question 33 can be found under Type Four codes.

SECTION 3 - PLANNING

34-42, 55. Questions 34 through 42 and Question 55 are related. If Questions 34 through 42 generally indicated no planning was done and if any Question 34 through 42 was not answered, answer y was coded C01 if 36y or 40y was answered, otherwise C03 was used (Question 41 was coded N/A).

34. If Question 55a was answered and Question 34e was not answered, answer 34e was coded C03. If Question 55b was answered and Question 34a was not answered, answer 34a was coded C03. If Question 55c was answered and Question 34b was not answered, answer 34b was coded C03.

35. Question 35 did not originally have a "None" answer. Therefore, there was no way for the participant to indicate "none of the above". If the participant was generally answering all of these questions and he left Question 35 blank, answer 35y was coded C03.

36. There was a typo error in answer 36c. CEM should have been CPM (Critical Path Method).

37-39. Questions 37 through 39 are related. If Question 37 was answered 37b through 37y and Question 38 was not answered, answer 38y was coded C01 or C03. In addition, the answer "lines of code" was left out of the original possible choices. The authors felt that had this answer been provided more particpants would have selected it. The answers that were based on size, i.e., length of the module, number of programs, number of instructions, etc., were lumped under "lines of code".

39. If Question 37 was answered 37e, and Question 39 was not answered, answer 39e was coded C01.

41. This question was slightly confusing. Some of the participants were not sure that the authors meant software only and total time. However, most of the answers appear to be reasonable.

42. Again, this question apparently was not clear since all of the planning activities did not always add up to 100 percent.

43-44. Questions 43 and 44 are related. If Question 43 was answered 43a and Question 44 was not answered, answer 44a was coded C01.

45-46. Questions 45 and 46 are related. If Question 45 was answered 45y and Question 46 was not answered, answer 46y was coded C01. This would have been a better question had we not specified only formal QA standards, but used instead either formal or documented QA standards. However, all of the participants appeared to answer with both in mind.

47. Question 47 did not originally have a "None of the above" answer; therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 47 blank, answer 47y was coded C03.

31, 48. Questions 31 and 48 are related. Question 48 did not originally have a "None" answer, therefore, there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 48 blank, answer 48y was coded C03. Also, Question 48 was so similar to Question 31 that if the participant did not answer Question 48 but he did answer Question 31, the same answers were used.

46-48. Questions 46 through 48 are related. If Questions 46, 47, and 48 were answered y and Question 49 was not answered, answer 49y was coded C03.

50. Question 50 did not originally have a "None" answer; therefore, there was no way for the participant to indicate "none". If the participant was generally answering all questions and he left Question 50 blank, answer 50y was coded C03.

51-52. Codes for Questions 51 and 52 can be found under Type Four codes.

SECTION 4 - ORGANIZATION

53. This question was not always answered properly (e.g., many people filled in "project manager" under "other"). By referring to later questions, it was apparent thay they meant one of the multiple-choice answers, and it was changed by the authors and coded C03.

55, 34. Question 55 is related to Question 34. If Question 34a was answered and Question 55b was not, answer 55b was coded C03. If Question 34e was answered and Question 55a was not, answer 55a was coded C03. However, if Question 55 was answered the following code was used to answer Question 55b:

ACB -- Administration Control Board.

56. On several occasions the participant answered either Question 56a or b and one of Questions 56c through f. This was frequently redundant and the answers to Questions 56c through 56f were eliminated.

58. This question is related to Question 22, Part One. If this question was incompletely answered, Part One answers and participants comments were used to answer Question 58 (coded C03). Also, through hindsight and written comments, two more questions were added which appeared to make the answer set more complete.

59. Again, this question was not properly answered. The participants apparently did not understand the difference between authorized and assigned. However, if Question 78A was answered and Question 59 was not, the sum of answers to 78A was inserted.

60-65. Questions 61 through 65 are related to Question 60. If Question 60b was answered and Question 61 was not, answer 61y was coded C01. This question could have been improved by including engineers with analysts.

63. If Question 61d was considered to be a "no" or Question 60b was answered and Question 63 was not answered, answer 63y was coded C01.

64. If Question 120 was answered properly (and it often was not) and if Question 64 was not answered, the correct answer could be derived.

65. If Question 60b was answered and Question 65 was not, answer 65y was coded C01. There was a variety of answers written into this question. Apparently the title of "team chief" is not constant within industry. The more common ones that appeared to be similar were lumped under answer 65d (a new answer).

66. There were almost no answers to this question. Apparently project managers do not make use of some of these exotic titles. The only one constantly written in was "software engineering". In addition, since Question 66 did not originally have a "None of the above" answer there was no way for the participant to indicate "none". If the participant was generally answering all the questions and he left Question 66 blank, answer 66y was coded C03.

67-68. Codes for Questions 67 and 68 can be found under Type Four codes.

SECTION 5 - STAFFING

68. Question 68 was duplicated. To avoid having to renumber all the questions from 68 on, the second Question 68 was renumbered 69f.

69-77. Questions 69 through 77, and 86 are dependent on Question 57. If Question 57 was answered 57y (no project manager) all y answers in Question 69 through 77 were coded C01 (N/A for Question 73).

If Question 69f was answered the following codes were used: (These same codes were used for Questions 93, 94, 105h, 109, 118, and 120).

Senior Corporate Officers

VPC -- Vice President, Data Processing

VPE -- Vice President, Engineering/Functional Area

VPG -- President or Vice President, General

Senior Management

MCP -- Senior Manager, ADP

MEN -- Senior Manager, Engineering/Functional Area

MGR -- Senior Manager, General (includes Division Manager)

MPA -- Assistant/Deputy Program Director

MPD -- Senior Program Director (as opposed to Project Manager)

Project Management

PEN -- Project Engineer

PMA -- Assistant Project Manager, Deputy Project Manager

PMC -- Project Manager, ADP/Computer

PME -- Project Manager, Engineering/Analyst

PMR -- Project Manager

PMS -- Project Manager, Subsystem

PMW -- Project Manager/Software

PTD -- Technical Director/Manager

First Line Supervisor

FAP -- Applications Supervisor

FEN -- Engineering Supervisor

FFS -- Fiscal Supervisor

FLS -- First Line Supervisors, General (includes group leaders, task leader, section head, technical leader, manager, supervisor, head, etc.)

FOS -- Operations Supervisor

FPC -- Project Control Supervisor

FSA -- Application Software Supervisor

FSD -- Software Development Supervisor

FSE -- System Engineer Supervisor

FSQ -- Software Quality Assurance Manager

FSR -- Software Requirements Supervisor

FSS -- System Software Supervisor

FSW -- Software Supervisor

FSY -- Systems Supervisor

FTC -- Team Chief

FTE -- Technical Supervisor

FTI -- Test and Integration Supervisor

FTM -- Test Supervisor

FVS -- Verification Supervisor

Lead ADP Personnel (includes Senior, Lead, Senior Project, Chief, etc., ADP personnel).

LPA -- Lead/Senior Programmer/Analyst

LSA -- Lead/Senior Analyst

LSP -- Lead/Senior Programmer

Lead Engineer/Functional Personnel (includes Senior, Lead, Senior Project, Chief, etc., Engineering/Functional personnel).

LSE -- Lead/Senior Engineer

LSW -- Lead Software Engineer

ADP Personnel

CAN -- Analyst

CDA -- Data Base Analyst

CDV -- Software Developer

CHP -- Chief Programmer

CMS -- Software Configuration Management

COP -- Computer operations

CPA -- Programmer/Aanlyst

CPJ -- Junior Programmer/Programmer Aid

CPR -- Programmer

Engineer/Functional Personnel

EAN -- Engineering Analyst

ECH -- Computer Hardware Enginer

EHW -- Hardware Engineer

EIG -- Integration Engineer

ENG -- Engineer/Functional/Designer

ENJ -- Junior/Associate Engineer - Engineering Aid

ENS -- System Engineer

ENT -- Test Engineer

ESW -- Software Engineer

Supporting Staff

SAC -- Accountant

SAD -- Administration

SAS -- Staff Assistant

SEC -- Secretary/Typist

SLI -- Support Librarian

SMG -- Support Manager/Supervisor

SOP -- Functional Operation

SPC -- Project Control

STS -- Testing

General (Unspecified Personnel)

WMT -- Member Technical Staff

WOR -- Worker, Individual, Staff

Other Positions

OCU -- Customer

OMA -- Mathematician

OTH -- Other

72. The following codes were used to answer this question:

001 -- High

002 -- Average

003 -- Low

75. Since Question 75 did not oroginally have "None" for an answer there was no way for the participant to answer "none". If the participant was generally answering all the questions in this section and he did not answer Question 75, answer 75y was coded C03. However, if he did answer, the codes used to answer Question 75f are the same as used in Question 32d. Answer 75f was divided into two answers, 75f1 and 75f2, to accommodate two languages and used the same codes as Question 32d.

76-77. Questions 76 and 77 are related. If Question 76a or b was answered and Question 77 was not answered, answer 77y was coded C01. In addition, two new answers were provided for this question--physics and science (an oversight on the part of the authors).

78. This question confused many of the surveyees. However, the answers are included in hopes they will provide benefit to somebody.

80. If Question 78f was answered by a "none" and Question 80 was not answered, answer 80y was coded C01.

81. If Question 65a was answered by a "none" and Question 81 was not, answer 81y was coded C01.

83-84. The answers to both of these were derived from the written answers provided.

85. The following codes were used in answering this question:

BBB -- Both within and outside the project resources

OOO -- Outside the project resources

WWW -- Within the project resources.

86. If Question 57y was answered and Question 86 was not, answer 86y was coded C01.

90. Codes for Question 90 can be found under Type Four codes.

SECTION 6 - CONTROL

91-94. Questions 92 through 94 were dependent on Question 91. If Question 91y was answered, those Questions 92 through 94 which were not answered were answered with a y and coded C01.

91. Again, as in Question 36, "CEM" was corrected to "CPM" and other systems were added. Several of those that were graphic in nature were lumped under the general type "graphics".

92. If Question 35c was answered "negative" and 92 was not answered, answer 92b was coded C03.

93-94. If Question 91y was answered and Question 93 was not, answer 93y was coded C01. If Question 91y was answered and Question 94 was not, answer 94y was coded C01.

If, however, Question 93 and/or 94 were answered the codes used in Question 69f were used.

99. If Questions 60, 61, or 65 indicated that teams were not used and if Question 99 was not answered, answer 99y was coded C01. The following codes were used in answering this question:

001 -- Always

002 -- Most of the time

003 -- About one-half of the time

004 -- Less than one-half of the time

005 -- Seldom

006 -- Never

99-101. If Questions 99d or 99e were answered "never" and Question 100 or 101 was not answered, answer 100y and 101y were coded C03.

102-103. Questions 102 and 103 are identical to Questions 20 and 21, Part One. If Question 20 was answered "no" and Questions 102 and 103 were not answered, answers 102b and 103y were coded C01.

104-105. Questions 104 through 105 are related. If Question 104 is answered 104y, and 105 is not answered, answer 105y was coded C01.

105. Question 105 was originally incorrectly numbered. Therefore, it was renumbered 105a through 105h, and 105y. If Question 105h was answered the codes used in Question 69f were used.

106, 108-109. Questions 106, 108, and 109 are related. If Question 106 is answered "no" and Question 108 and 109 are not answered, Question 108b was answered C01 and Question 109 was answered N/A.

106. There were almost no answers given to Question 106a; however, if answered, the following codes are used in answering this question:

CCS -- Configuration Control

CUS -- Customer supplied

HAC -- HAC system

IHD -- In-house developed

LIP -- LIP SVC

MAN -- Manual

SDM -- Software Development Manager

SKD -- SKD

483 -- MIL-STD-483

109. The codes used in answering this question were the same as for Question 69f.

110-114. The Questions 110 through 114 are related. If any of the questions are answered with a y, then those that are not answered will have y coded with a C01.

115. Codes for Question 115 can be found under Type Four codes.

SECTION 7 - DIRECTING/MONITORING

118. If Question 118 was not answered sometime an answer could be derived from elsewhere in the survey. If Question 118 was answered the codes used are the same as for Question 69f.

119. This question was completely confusing to many people who apparently did not know a definition of the term "span of control". Span of control was meant by the authors to be the number of people that were under the direct supervision of the project manager. From the large numbers that appeared, apparently most people answered the total number of people that were under the project manager.

120. The codes used for answering 120A and 120B are the same as for Question 69f. If Question 120g was not answered it could sometimes be derived from answers to 120A, B and C.

121. Question 121 is dependent on Questions 104 and 110. If Question 104 and 110 answered 104y and/or 110y and Question 121 was not answered, answer 121y was coded C03.

123-124. Questions 123 and 124 are related. If the answer to Question 123 was "no" and 124 was not answered, answer 124y was coded C01. If Question 124 was answered 124a, b or c and Question 123 was not answered, answer 123Ba was coded C03.

123. Answer 123c had a typo. It was corrected from "moderation" to "motivation".

127. Codes for Question 127 can be found under Type Four codes.

SECTION 8 - DELIVERABLES AND SUCCESSES

In general, Section 8 lacked one point of clarity. It was the authors' intent to talk only about software deliverables and successes. However, the word software was not always emphasized, and we believe that some of the answers involved the entire project, which could have been partly hardware and partly software. Where the project was all software, of course, the answers applied to software. In those incidences where software was the pacing factor, then we are sure the answers also applied only to software. Where the pacing factor was hardware, you could be led to believe that the problems were associated with hardware and not software. The authors leave it up to the reader's discretion to evaluate exactly what the answers mean.

128-149. Questions 128 through 149, 153 and 154 are related. If Question 128a, 128b or 128y was answered (or some comment to the fact there was insufficient data to complete this section) and Questions 129 through 149, 153 and/or 154 were not answered, answers y were coded C01 (Questions 132 and 135 were coded "N/A").

129-133. Questions 129 through 133 are related. If Question 129a was answered and Questions 130 through 133 were not answered, answer y was coded C01. (Question 130 was coded "N/A".)

129. Answers to Question 129b were divided into 129b1 and 129b2, and answers to Question 129c were divided into 129c1 and 129c2. Answers b1 and c1 are reported in number of months; answers b2 and c2 are given in percent.

130. If Question 130a was answered "negative" and Question 132 was not answered, answer 132 was coded "N/A".

131. This question has been deleted from this modified version of Part Two of the questionnaire. It was meant to have been deleted during the last typing because it duplicated Question 129, but it was left in by error.

134-137. Questions 134 through 137 are related. If Question 134a was answered and Questions 133 through 137 were not naswered, answer y was coded C01 (Question 136 was coded "N/A").

134. Answers to Question 134b were divided into 134b1 and 134b2, and answers to Question 134c were divided into 134c1 and 134c2. Answers b1 and c1 are reported in dollars using the same method as in Question 18; answers b2 and c2 are given in percent.

135. If Question 135a was answered "negative" and Question 136 was not answered, answer 136 was coded "N/A".

138-141. Questions 138 through 141 are related. If Question 138y was answered, and Questions 139 through 141 were not, answer y was coded C01.

141. If Question 138a was answered and Question 141 was not, answer 141d was coded C01.

142-144. Questions 142 through 144 are related. If Question 142y was answered and Questions 143 and 144 were not, answer y was coded C01.

143. If Question 142a was answered and 143 was not, answer 143d was coded C01.

145-147. Questions 145 through 147 are related. If Question 145y was answered and Questions 146 and 147 were not, answer y was coded C01.

145. If Question 145a was answered and 146 was not, answer 146d was coded C01.

146. As stated, those questions that were originally narrative have been turned into multiple choice questions by taking the given answers and making them into logical groupings. There were too few answers to Question 146a to do this; therefore, it is left in its original narrative form.

155-157. Questions 155 through 157 are related. If Questions 155 through 157 indicate that on-line programming was not used in the development of this project and some or all of these questions were not answered, answers y were coded C01.

159. Codes for Question 159 can be found under Type Four codes.

PART THREE

Questions 1, 2, 3 and 4, and 25 of Part Three are added to this report as Questions 160, 161, 162, 163, and 164.

161-162. Questions 161 and 162 are related. If Question 161a was answered and Question 162 was not, answer 162y was coded C01. If Question 161c was answered and Question 162 was not, answer 162g was coded C01.

164. Codes for Question 164 can be found under Type Four codes.

TYPE FOUR CODES

This section reflects the codes used to answer narrative or lessons learned type questions. With the exception of Question 164 all codes are listed by type rather than question.

Codes for Question 164.

A01 Software engineering management is not different from R&D or prototype development of hardware.

A02 It is an error to compare software development with the production phase of hardware.

A03 Many questions are philosophic.

A04 Software engineering is new.

A05 Many approaches to software development management are valid.

A06 Initial higher cost at the beginning of a project caused by using software engineering techniques will be offset by savings later on.

A07 Software development is a tough management problem.

A08 We do not know if the initial higher cost of software engineering techniques will be offset by savings later on.

A09 Case studies of software development are required.

A10 Cost and scheduling of a project are a problem.

A11 Survey was too theoretical (orderly progress from beginning to end) for our project.

A12 Requirement specficiations required extensive modification before development.

A13 We should expect some of the "art" of software development to always remain with us and accept it.

A14 Survey was exhaustive and exhausting.

A15 Good luck.

A16 Too much emphasis upon quantification of subjective functions.

A17 Most important function is visibility of progress and automated procedures.

A18 Hope you get many returns.

A19 I hope you do not find my answers too difficult to understand.

A20 Many good ideas in Questionnaire, good job.

A21 You should follow on answers with telephone interviews.

A22 Survey was redundant and could be shortened.

A23 Good judgement and experience is more important than cook book techniques and tools.

A24 Survey was not too applicable to be answered by customer.

A25 My answers to these questions came from my experience in developing command and control systems.

A26 Data should be collected by interview.

A27 Separating software development management from hardware development management in this survey is a mistake.

Codes for Questions 33, 51, 52, 67, 68, 90, 115, 127 and 159

How the narrative answers were coded. The first element of the code (one or two letters) is:

R -- Requirement function (this is a sub-set of planning)

P -- Planning function

X -- Design, Code and Test function (this is a sub-function of planning)

O -- Organizing function

S -- Staffing function

ST -- Training

C -- Controlling function

CV -- Reviews

CW -- Walk-throughs

CS -- Software standards

CM -- Configuration management

CT -- Test and verification

C -- Directing function

The second element (when used) is a number in order to distinguish between otherwise identical codes, except "R" which is used to designate the surveyee suggested R&D is necessary.

Requirements

R1 Software requirement specifications (baseline) should have the following general attributes.

a. Accomplish its intended function of specifying the requirements.

b. A (more) formal project phase (function)

c. Based on a (thorough/careful) analysis

d. Correct

e. Useable by the software developer

f. (more) Complete

g. Clear, readable and understandable

h. Unambiguous and consistent

i. (more) Specific and detailed

j. Delivered on time (before beginning software design)

k. Reviewed prior to use

l. (more) Emphasized throughout the project

m. Testable

n. Compatible with other functions (hardware)

o. Controlled and/or baselined

p. Any attributes or method will be acceptable

y. None required.

R2 Software requirement specifications should not (be/have):

a. Include detail design

b. Only describe the process

R3 Software requirement specifications should contain the following:

a. A description of the user's operation

b. Test requirements

c. Detailed test plan

R4 Software requirement specifications should be developed jointly (or involve) personnel assigned to the following functions (this is also part of the organization function):

a. Contractor

b. Customer

c. User

d. Operator

e. Programmer

f. System engineer

g. Software engineer

R7 Software requirement specifications should be developed through the use of:

a. Top-down techniques

b. Structured techniques

c. Hierarchical techniques

d. Incremental (phased) techniques

e. Modular techniques

f. Simulation techniques

g. (more) Automated tools

R9 Miscellaneous lessons learned and/or comments concerning software requirements specifications.

a. Agree on specifications between customer and developer.

b. Make sure system design is feasible before beginning software design.

c. If you want the software to be reliable, maintainable, etc., put it in the contract.

d. More emphasis on reliability, maintainability and useability.

e. Many people do not know how to write requirement specifications.

f. MIL-STD-483 needs updating/improvement.

RR R&D in software requirement techniques should include:

a. Developing a formal requirement methodology.

b. How to do requirement specifications development through simulation.

c. How to analyze requirement specifications.

Planning

P2 The planning function should have the following general attributes:

a. Accomplish its intended function (correctly and cost effectively).

b. Based on a (thorough/careful) analysis.

c. (more) Specific and detailed.

d. Delivered on time (early in project).

e. (more) Fully documented.

f. Reviewed prior to use.

g. Reviewed throughout the project.

h. (more) Emphasized throughout the project.

y. None required.

P3 Planning should include (be improved in) the areas of:

a. A development plan and procedures.

b. Accurate cost and scheduling.

c. Formalized and detailed testing planning.

d. Training plan.

e. A fall back position if problems develop.

f. Prioritizing work load.

g. Staff functions.

P4 Planning and the planning function should be developed jointly (or involve) personnel assigned to the following functions (this is also part of the organization function):

a. Contractor.

b. Customer.

c. Project personnel.

d. Software analyst.

e. Programmer.

P5 The project and/or project manager should be provided with the following:

a. More resources.

b. Better availability of (additional) supporting resources.

c. Better availability of (additional) computer support.

d. Better availability of development and test tools and support software.

e. Better availability of (additional) administrative support.

f. Adequate direction and guidance.

g. A means of determining computational efficiency.

h. Access to existing in-house expertise.

i. A formal support library system.

P8 In planning for a software development project, more time and effort should be allowed for the following project functions:

a. The requirement specification phase.

b. The planning phase.

c. The software development phase.

d. Cost and scheduling phase.

e. The design phase.

f. The programming phase.

g. The test phase.

h. Reviews.

i. Documentation

j. All phases of the development.

P9 Miscellaneous lessons learned and/or comments concerning planning:

a. Do not allow the planning function to be pre-empted by short range tasks.

b. Determine, in advance, if the development facility will support the project.

c. Do not use "seat of the pants" planning.

d. The first time a system is built is always a problem.

e. All resources should be in close proximity.

f. Use vendor supplied OS.

g. Do not let customer change schedule and software design without contractor agreement.

h. Politics plays a more important role than technology.

i. Have more than a few "super stars" on the team if you expect success.

j. Estimate high; expect the worse.

k. Scheduling around holidays caused delays.

PR R&D in the planning function should include:

a. Improvements in sizing, cost and estimating methods (accuracy).

b. A better method to assess impact of changes on cost and schedules.

c. Determining (research in) software life-cycle costs.

d. Review of on-going projects to determine empirical planning factors for evaluation (and disseminate the best factors).

e. Standardize planning, reporting, estimating and measurement techniques.

Design, Develop, and Code

X1 The software development function should have the following general attributes:

a. A (more) formal project phase.

b. Correct.

c. (more) Specific and detailed.

d. Delivered on time.

e. (more) Fully documented.

f. Controlled and/or baselined.

X4 The software should be developed jointly by (or involve) personnel assigned to the following functions (this is also part of the organization function):

a. User.

X7 Software should be developed through the use of:

a. Project management system.

b. Top-down techniques.

c. Structured (development) techniques.

d. Modular techniques.

e. Appropriate (HOL) language techniques.

X9 Miscellaneous lessons learned and/or comments concerning software development.

a. Consider all past experiences in planning a new project.

b. Have all unproven software technologies accepted by a review team prior to use on project.

c. Software development more a management problem than a technical problem.

d. More emphasis on automated software design tools.

e. Use industry standard software design techniques.

f. System designers should have more knowledge of software during early design stage.

g. Documentation and flow charting are very expensive.

h. Average software designer fails to see use for discipline until job is near done.

i. Project manager's approach should be validated.

j. Team members should select development methods used.

k. Use a common language where practical.

l. Use self-annotating source lists.

m. Element requirement for flow charts (prior to code completion).

n. More desk checking is required.

o. Complete detail software design before beginning programming.

p. Do not freeze design before completion of coding.

XR R&D in software development techniques should include:

a. More design of (automated) design tools and aids.

b. Surveying and evaluating available software development tools and techniques.

c. Develop (and disseminate) design validation techniques.

d. Publish software design techniques standards.

e. Develop a system design language.

f. Research into software reliability: error types and solutions.

Organizing

01 The organizational structure (rules and authority lines) should accomplish the following:

a. Be defined.

b. Be enforced.

c. Define the authority line (better).

d. Define the responsibility (better).

e. Define a single, leadership function.

f. Define relationship between administration and technical personnel.

02 The role of ADP in the organization is to include:

a. Combine all programmers and analysts into one group.

b. Have the programmer and analyst report to the ADP manager.

c. Assign software specialist to the senior manager staff.

d. Have the ADP function report higher up in the project.

03 Require (or permit) the following organization structure and/or responsibilities:

a. Software to be responsible to overall system requirements.

b. Hardware to be responsible to overall system requirements.

c. Program manager (with the authority to do the job).

d. (more) Authority to the technical subordinates (less central authority to project manager).

e. Software test team not under the project manager.

f. Software testing under software project manager.

g. A (large) technical staff.

h. Senior management to participate in project.

04 Miscellaneous lessons learned and/or comments concerning organization structure:

a. Interface at detail level with customer is costly and time-consuming.

b. Interface with IV&V contractor is costly and time-consuming.

c. Should not allow intermediate agencies between customer/user and the designer/programmer.

d. Should not allow involvement of organizations and/or personnel who cannot contribute to the software development.

05 The organization structure (type) that is best suited for a software engineering project is:

a. A formal organization.

b. Tailored/adapted to the job.

c. Best suited to company environment.

d. Depends on size of project.

e. A functional organization.

f. A line organization.

g. A project (task) organization.

h. A matrix organization.

i. Organized under a project manager (with full authority).

j. Organized under a manager with (strong) technical responsibilities.

k. Organized under a manager with (complete) administrative responsibilities.

l. Organized under an ADP organizational function.

m. Not organized under an ADP organizational function.

n. Doesn't matter what type of organization.

y. The project was not organized.

06 Other special organization structures (types) used or should be used are:

a. Special planning team.

b. Integrated programmer-analyst teams.

c. Project teams.

d. A standing review team.

e. Chief programmer teams.

f. Requirements analyst team.

g. Small design and/or programming teams.

h. (separate) Interface team.

i. (separate) Test teams.

j. (separate) Documentation team.

07 The software development project (teams) should have as members:

a. Customers.

b. Managers.

c. Functional analysts.

d. Programmers.

e. Junior programmers/programmer aids.

f. Support librarian.

g. Lead (chief) programmers.

h. Back-up programmers.

i. Hardware vendors.

09 Miscellaneous lessons learned and/or comments concerning project organization types are:

a. The project organization should have a permanently assigned staff.

b. The matrix organization enables people to be removed for short periods of time without hurting project.

c. The matrix organization improved the overall training program.

OR R&D in organizational functions should include:

a. Research for planning for an organization.

b. Research for a testing organization.

c. How many support librarians are required on a project.

Staffing

S1 The staffing function should:

a. Provide an adequate, qualified staff.

b. Allow for early moving of personnel.

c. Provide for an experience and skill mix.

d. Identify quality of persons early.

e. Have "open ended" training programs as "personnel buffers".

f. Assign stronger technical personnel to head teams.

g. Apply appropriate talent ot the appropriate jobs.

h. Use different level of programmers for different aspects of job.

i. Have (more) permanently assigned staff.

S2 The staffing function should not (be/have):

a. Remove personnel to put out brush fires.

b. Build up the staff too fast.

c. Have too many (high-level) people during initial design.

d. Select software test team members from programmers who designed programs.

e. Have a general lay-off (reduction-in-force) just prior to starting project.

S5 The project manager should (be/have):

a. Managerially and technically qualified for the job.

b. Good.

c. Experience in programming techniques.

d. Experience in management techniques.

ST The training function should (be/have):

a. Provide adequate training.

b. A (more) formalized, staffed training program (function).

c. Better.

d. Screen personnel for skills to eliminate on-the-job training.

e. Identify training requirements early.

f. Provide training in new design technologies.

g. Provide training in basic programming and documentation.

h. Provide training in application function.

i. Provide training in documentation principals.

j. Provide training in software acquisition.

k. Provide training in management.

l. Provide training in hardware used.

m. A better training facility.

SR R&D in staffing should include:

a. (Better) methods of evaluating background/experience (vs project requirement).

b. A study of what factors influence proper mixture of skills.

c. Different skills and specializations needed for a project.

d. Investigation into what backgrounds leads to higher performance (production).

e. How do you staff for a changing project?

Direction

D1 The direction function should (be/have):

a. Applied properly to effect a successful delivery of the software system.

b. (More) formal.

c. Documented.

D3 The direction/motivation function should (be/have):

a. Motivate programmers to be aware of their importance.

b. Motivate programmers to be aware of being a professional.

D5 Management should promote good and/or improved communications (interface) between:

a. Customer (user) and developer.

b. System designers and analysts/programmers.

c. Management and technical personnel.

d. Programming and test personnel.

D9 Miscellaneous lessons learned and comments:

a. Highly motivated inexperienced staff can constantly out perform less motivated senior staff.

b. Never believe anything a computer vendor says.

DR A R&D in direction should include:

a. How to improve and maintain communications.

b. Survey present methods and use the best.

Control

C1 The control function should (be/have):

a. Provide exacting control and feedback over the project.

b. (More) formal function.

c. Enforce the use of controls already established.

d. Provide (better) project status visibility.

e. An automated means of monitoring software development.

f. Modularize work into definable tasks (WBS).

g. Control the requirement specification function.

h. Control project resources.

i. Software separate from hardware.

j. Include rate charting to monitor progress.

k. Record time vs activity.

CV The review process should (be/have):

a. Hold effective reviews.

b. (More) periodic/extensive.

c. Done at critical milestones in project.

d. Qualified staff is available for reviews.

e. Review requirement specification for accuracy.

CW Walk-through should (be/have):

a. Used as a peer review of the software.

b. (More) formal.

c. Used more extensively (scheduled).

CS Software standards should (be/have):

a. Developed for more functions.

b. Expanded to a greater detail.

c. Enforced.

d. Simplified.

e. Monitored.

f. Developed for software design.

g. Developed for programming (coding).

h. Developed for documentation.

i. Developed for debugging tools.

j. Not have a fixed number of lines of code per product.

CM Software configuration management should (be/have):

a. Provide control of software undergoing development.

b. (More) formally applied.

c. Flexable to accommodate required change.

d. Used (earlier).

e. Enforce strict adherence to baseline.

f. Formal document changes.

g. Control changes to baseline.

h. Restrict software change in requirement specifications to minor changes at the start of development.

CT Test and verfication functions should (be/have):

a. More formally applied.

b. Emphasized.

c. Used.

d. Software error checking.

e. Incorporate traceability from requirement specification to final code.

f. Applied top-down.

CR R&D required in control should include:

a. The development of traceability techniques.

b. Research into monitoring a project.

c. Research into how to test delivered software.

d. Methods to automatic configuration management aids.

e. Research into (automatic) control techniques, tools and procedures.

f. Automatic status reporting without frequent inputs from project individuals.

g. How to measure software productivity.

COMPUTERWORLD
THE NEWS WEEKLY FOR THE COMPUTER COMMUNITY
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June, 1978

Dear Census Respondee,

The Computerworld Research staff would like to thank you for your cooperation in responding to our Worldwide Computer Installation Census. It is only through such continued cooperation that we are able to successfully monitor the growth trends of the computer industry.

As an expression of our appreciation, we are pleased to present the results of a census report prepared by the staff at our publishing affiliate, EDP INDUSTRY REPORT. This "real world" census is the product of a direct extrapolation upon our Worldwide Computer Installation data base.

We hope you will find the enclosed information extremely interesting. We look forward to hearing from you again next year.

Sincerely,

Computerworld Research Staff

SMALL BUSINESS COMPUTER CENSUS

The categorization of certain computers as "minicomputers" is based on marketplace definitions as perceived by IDC. Minis are general-purpose in design but sold as tools, not just solutions; are available from the makers as complete systems, not just boards; are available to OEMs and usually discounted in volume buys; and are part of a family that has at least one product in the $2,000-$25,000 price range and comes with at least 4K RAM. Size classes are: (S) Supermini; (T) Traditional Mini; (M) Micromini.

AS OF JANUARY 1, 1978

NAME OF MANUFACTURER	COMPUTER MODEL	PROCESSOR MODEL	NOTES	PURCHASE PRICE ($1,000) BASIC	PURCHASE PRICE ($1,000) AVERAGE	DATE OF FIRST INSTALLATION	NUMBER INSTALLED IN U.S.	NUMBER INSTALLED OUTSIDE U.S.	TOTAL NUMBER INSTALLED	ORDERS FOR 1978 INSTALLATION
Advanced Information Design	System 9000	Interdata 7/16		24	39	2/75	36	7	36	46
	System 4000	Interdata 8/32		49		1/78	NA	NA	NA	NA
American Management Systems, Inc.	AMS 38/1C	Nova-1		14		1/76	-	0	-	NA
	CPS-11	PDP-11/34		15	100	8/76	0	2	2	18
Anderson-Jacobson, Inc.	1600	AJ 1600	a	16	23	1/70	240	15	275	c
	1300	AJ 1300		20	25	7/77	40	0	40	NA
Applied Data Communications	Event	Event		13	20	2/77	27	3	30	350
Applied Data Processing, Inc.	Resource/100	Nova 3/12		39	98	6/76	10	0	10	15
Bell Computer Products	DABL	Nova-2/10		38	40	6/75	1	2	3	3
Basic/Four Corp	200	BPC 1140		29	29	2/78	0	0	0	1,000
	350	BPC 1300, Microdata	b	34	36	9/71	500	576	1,076	c
	400	BPC 1300, Microdata	b	37	45	9/71	1,400	1,268	2,668	800
	500	BPC 1300, Microdata	b	39	50	7/72	100	82	182	c
	600	BPC 1300, Microdata	b	51	65	3/75	100	308	408	c
	610	BPC 1320		51	68	1/78	0	0	0	150
	700	BPC 1320		115	130	/77	50	38	88	160
Basic Timesharing, Inc.	4000/15	BTI -020		36	40	1/76	216	4	220	100
	4000/25	BTI -020		36	45	1/76	317	8	325	300
Bizarre Corp.	System 1	Bizarre		15		7/78	0	0	0	NA
Binary Data Systems	DCDM-1	Nova-1		45	60	11/75	48	5	48	13
	DCDM-2	Dual Nova-1		95	120	1/76	30	0	20	4
	DCDM-3	Eclipse		120	170	6/76	4	2	6	10
	DCDM-4	Dual Nova-1/D		200	285	9/77	16	2	18	20
Burroughs Corp.	800	850		20	35	11/76	850	950	1,800	2,300
	8700	8700		20	67	3/73	1,400	1,650	4,050	1,500
	8800	8800		32	52	3/77	100	170	470	
Business Controls Corporation	System 85	PDP-8/a		25	40	6/71	100	0	100	30
	System 80	PDP-11/34/45/60/70		45	75	8/75	23	0	25	15
Business Systems Products, Inc.	Adviser II	Computer Auto.		35	45	7/76	30	5	30	NA
	Adviser III	Computer Auto.		65	85	9/78				NA
Cascade Data, Inc.	60/30, 40, 40	Concept		28	45	1/76	30	0	30	c
	Concept II	Concept		25	45	6/75	200	15	215	30
	Concept III	Concept		27	47	1/78	0	0	0	10
	Concept IV	Concept		18	23	4/78	2	0	2	10
Century Computer Corp.	C-200	C-200, 400		34	45	3/75	150	30	180	NA
	C-700	C-200, 400		38	55	6/76	40	10	50	NA
	C-900	C-400		27	40	6/77	100	20	120	NA
	C-1000	C-400		40	50	6/77	15	0	15	NA
	Omni III	C-200		13	17	3/71	360	40	400	c
Cincinnati Milacron	George-40	CIP/2200B		16	20	2/77				
	George-60	CIP/2200B		26	34	/76				
	George-70	CIP/2200B		29	35	/76	565	120	665	350
	George-80	CIP/6400		41	60	12/74				
	Other	CIP/2200B		23	34	/76				

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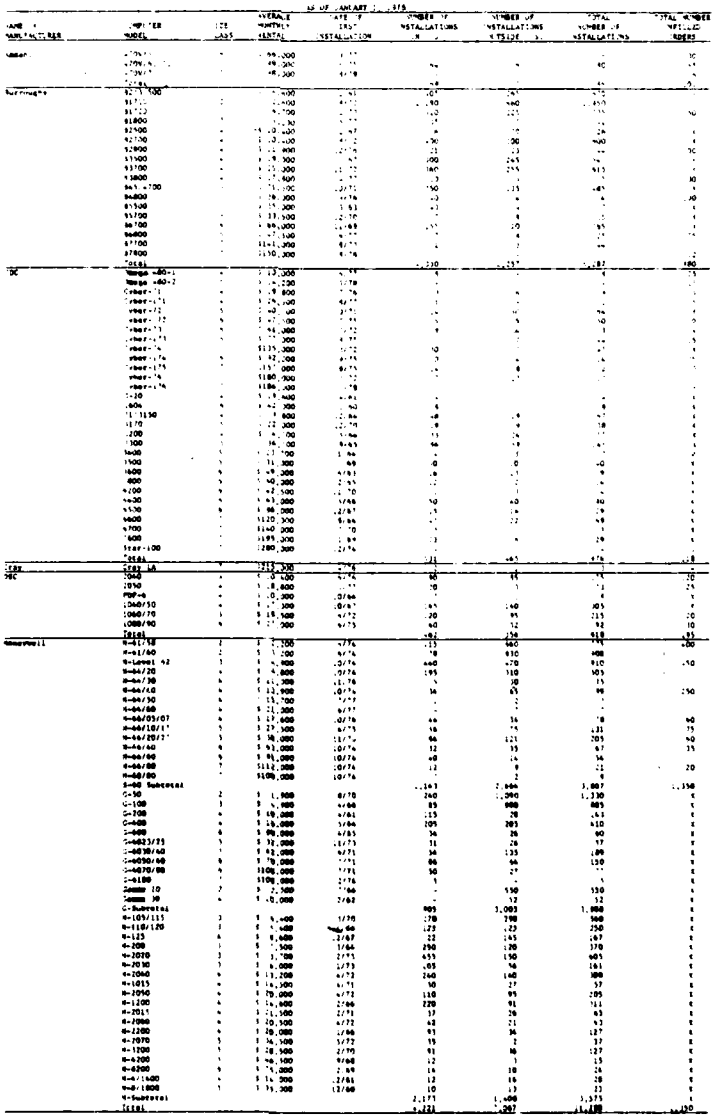
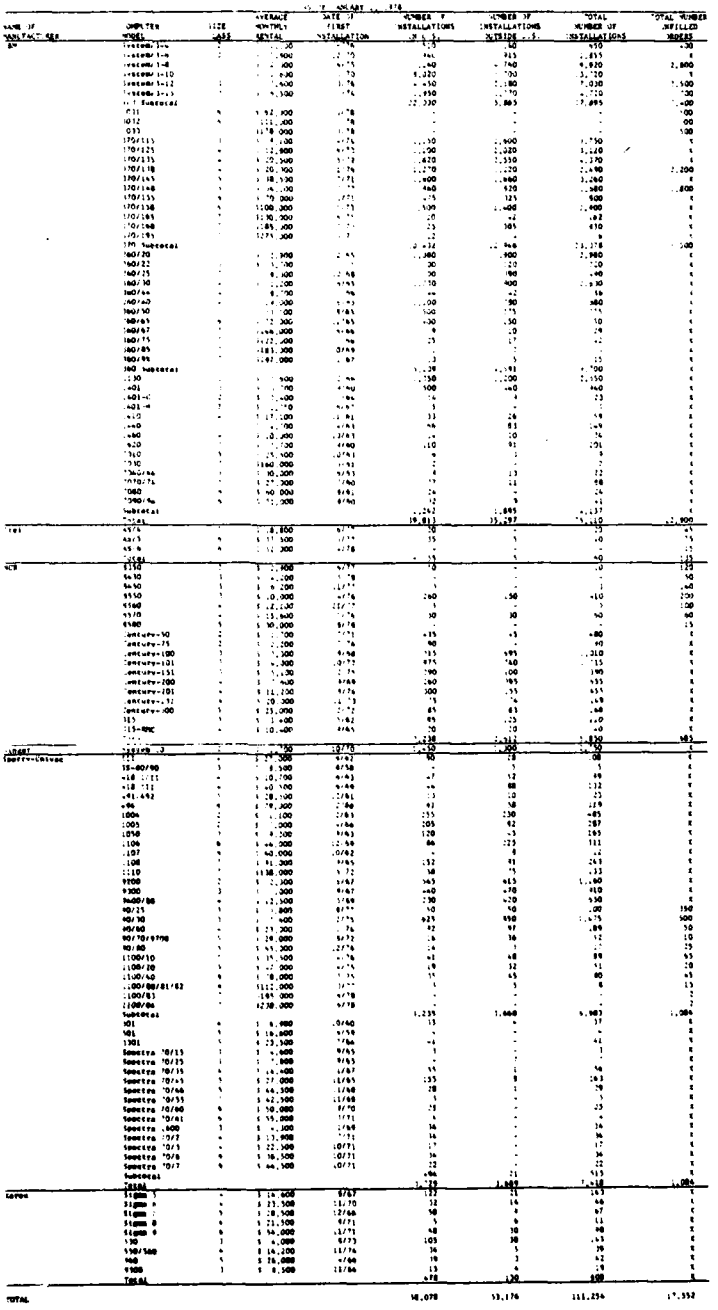
...ary Data Systems*	40A	Vlary	9	30	1.70	490	22	22	4
Complete Computer	(I-)	Nova-1/12	38	42	10/76	18	3	18	
Systems	(II-)	Nova-3/12	42	63	10/76	10	3	10	10
	(V-)	Eclipse-S/130	55	80	10/76				
Compucorp	402	Compucorp 1000	13	15	1/76	15	455	470	4
	450	Compucorp 3000	20	22	4/76	40	115	155	NA
	625	360	7	10	9/77	20	130	150	NA
Computer Systems	Series/1	IBM Series 1	16		10/77	2	1	3	30
Computer Hardware, Inc.	2120	CHI	15	20	3/75	15	1	16	4
	2130C	CHI	32	71	7/76	40	1	155	20
	21300	CHI	44	120	1/78	2	0	2	10
	3230	CHI	15	30	4/76	3	0	3	15
	4210	CHI	10	12	3/77	3	3	3	30
Computer Horizons Corp.	CHI Distribution System	PDP-11/34, 70	30	200	10/76	9	1	9	9
Computer Interactions, Inc.	Compo II-8	PDP-8/a, f, e	45	90	11/75	163	1	163	40
	Compo II-11	PDP-11	30	40	6/75	47	1	47	10
Data General	CS/40	Nova-3/12	11	40	10/77	25	3	55	NA
	DCC 1500	DCC-416	6	6	7/76	15	3	15	4
	DCC 2500	DCC-Nova 3	9	29	7/76	25	3	25	4
	DCC 3700	DCC-416	1	40	7/76	10	3	10	
	Design Data M312	Nova-3/12	8	31	9/75	120	10	130	4
	Design Data EC300	Eclipse C/300	4	60	1/76	10	10	60	4
Decision Data Computer Corp.	System/4	System/4	23	37	6/76	5	3	15	25
Diablo	3200	8080	9	13	1/77	180	70	250	300
Digital Equipment Corp.	Datasystem 300	PDP-8, PDP-11	14	28	7/72	1,600	1,500	3,100	1,300
	Datasystem 400	PDP-11	58	110	72	450	400	1,250	300
Digital Systems Corp.	Galaxy/S-130	Galaxy/S	35	50	7/76	9	3	9	25
	Galaxy/S-140	Galaxy/S	46	90	4/76	9	3	9	9
	Galaxy/S-150	Galaxy/S	100	130	12/76	3	3	3	4
	Galaxy/S-160	Galaxy/S	150	180	8/77	3	3	3	3
	Galaxy/S-170	Galaxy/S	130	180	9/77	3	3	3	3
Diablo, Inc.	Qmag 100	Wordcomp II	133	180	7/76	3	3	15	8
Display Data Corp.	Insight	Microdata .600/10	38	42	7/76	100	3	100	100
Educomp Corp.	E-100,200,300,400	PDP-8	4	15	7/72	3	3	3	NA
(Quadara)	E-600,700,800,900	PDP-11	46	100	7/75	188	9	197	NA
	30P/78	PDP-8	10	10	7/77	3	3	3	NA
	EC8/78	PDP-8	10	11	7/77	3	3	3	NA
Financial Computer Corp. (Podder)	System III/6	System III	19	25	9/77	25	3	25	NA
	System III/8	System III	23	32	9/77	20	0	20	NA
	System III/10	System III	30	45	6/75	400	50	450	NA
Gemini Information Systems	Ilspac/16	Interdata X/16	48	95	4/75	20	3	20	10
	Ilspac/32	Interdata X/32	86	110	4/76	11	3	11	5
	Ilspac/1	Series/1	48		7/78	0	0	0	10
General Automation, Inc.	SM-130/5	SPC-16/45	28	38	12/74	225	225	350	15
	SM-430	SPC-16/45	30	38	12/74	70	40	130	10
	SM-440	SPC-16/65	48	80	1/75	40	18	28	5
General Information Systems	IIS-150 ABLE	PDP-11/34	42	47	7/76	9	3	9	12
General Robotics Corp.	11/X3	LSI-11	5	7	9/76	95	30	105	10
	FD/X3	LSI-11	15	22	9/76	100	50	150	300
	CD/X3	LSI-11	25	38	9/77	20	10	30	100
IBI Computer Corp.	System 30	IBI 30/30	30	35	1/76	140	50	190	NA
	System 30/5	IBI 30/32	43	50	12/77	5	1	6	NA
IBM Corp.	System/32	System/32	33	42	3/75	14,800	5,300	20,100	0.300
	System/34	System/34	32	50	12/77	0	0	0	3,200
International Computing Company*	System 95/99	Nova-2/10	24	35	10/72	9	0	9	4
Lockheed Electronics Co., Inc.	System III	Lockheed SUE	30	50	1/75	340	60	400	NA
Logical Machines Corp.	ADAM	ADAM	35	38	4/75	240	120	360	480
Martin Wolfe Inc.*	Nova Two 7000	DCC-116	54	81	11/71	140	3	143	4
	Nova Two 4000	DCC-116	62	93	2/76	3	3	3	3
Micromata	Reality	Microdata 1600	32	40	12/73	1,170	200	1,370	400
	Empress	Microdata Empress	39	50	11/76	10	3	13	NA
Mini-Computer Systems, Inc.	Micos	Nova-3/12	50	89	7/73	590	250	840	250
	Micos II	Nova-3/4	39	51	9/77	10	30	40	80
Mitsubishi Computer Corp.	1771	Nova-2/4	35	40	12/71	15	0	15	NA
	1775	Nova-2/10	37	44	3/72	11	0	11	NA
	1776	Nova-2/10	40	49	3/72	21	0	21	NA
	1776/A	Nova-3/12	40	45	5/77	5	2	5	NA
Mylex Digital Sciences, Inc.	3000 Series	Mylex 1C	25	43	5/78	75	0	75	40
NCR Corp.	8130	NCR	25	34	5/78	0	0	0	300
	8150	NCR	29	38	12,77	5	0	5	300
	8200	NCR	33	46	9/75	800	1,050	1,850	4
	8230	NCR	29	43	5/77	100	0	100	200
	8250	NCR	42	60	12/76	250	950	1,200	1,500
Nerfield Dataсystems, Inc.*	Nova-system	Nova	35	40	9/73	20	0	20	4
Northrup Data Systems	80S 500	Microdata .800	30	44	7/78	0	0	0	NA
	80S 700	Microdata 1600	39	50	3/77	5	0	5	NA
	80S 1000	Microdata 1800	50	75	4/72	55	0	55	NA
	80S 2000	Microdata 1800	63	100	10/73	65	0	65	NA
Pick & Associates	Pick System	7846	64	75	11/75	12	4	16	100
	Pick System	7781	81	90	10/77	1	0	1	50
Programmed Control Corp.	Prophet 1171	PI 960-8	42	45	72	30	0	30	NA
	Prophet 21.2	PI 990/10	57	100	1/78	0	0	0	NA
PI Corporation	LMC	PI	31		2/76	100	0	100	250
	LITE	PI	21		2/77	250	0	250	550
Qantel	800/900	Q7	28	29	5/75	93	73	166	4
	950	Q7	32	30	11/75	382	102	484	NA
	960	Q7 S	48	56	12/76	15	5	20	4
	1200	Q7	42	59	12/75	213	23	236	4
	1300	Q7.5	62	59	11/75	44	18	62	8
	1400	Q7.5	44	50	5/77	136	21	157	NA
Randal Data Systems	Link-100	Randal	13	23	10/75	184	0	184	20
	Link-140	Randal	13		7/78	3	0	3	120
	Link-200	Randal	27	35	10/76	132	0	132	60
	Link-100	Nova-2/10	36	45	9/74	27	0	27	4
	Link-400	Nova-2/10	36	45	9/74	4	0	4	4
	Link-500	Randal	48	50	10/77	20	0	20	50
R.D. Smith	Nova Two	Nova-3	58	58	5/77	3	3	6	NA
Spam Management Systems	TSB-2	IBM Series/1	31	11	7/77	18	3	21	900
Sperry-Univac	SC-7	Univac	28	45	4/77	195	5	200	800
STC Systems	Dictamacc-2000	Nova-1200	51	95	9/72	90	2	92	10
	Dictamacc-3010	Nova-3/D	55	112	1/75	15	2	17	20
	Dictamacc-3080	Nova-1/D	86	143	12/75	7	0	7	12
Tri-Star, Inc.	TTE-10	Nova-1/12	45	55	2/76	12	0	12	4
	TTE-80	Nova-3/12	32	47	4/76	4	2	6	NA
Vanguard Computer Systems, Inc.	V400	Raytheon 704 300	45	85	3/76	5	2	7	20
	V600	Raytheon 704 300	45	52	9/77	0	2	2	20
Wang Laboratories, Inc.	2200	2200	10	20	12/73	9,800	4,380	14,180	3,300
	2200 VP	2200 VP	15	20	9/76	750	320	1,070	1,100
	2200 MVP	2200 MVP	18	28	12/77	0	0	0	150
	2200 VS	2200 VS	47	80	10/77	15	5	20	100
Warren Computer Corp.	Centurion I-A	CC-201	18	19	7/77	41	0	41	40
	Centurion II-A	CC-202	27	30	7/75	74	0	74	70
	Centurion III	CC-203	36	38	7/76	124	0	124	200
	Centurion IV	CC-204	43	43	7/78	53	0	53	60
Vistec Computer Corp.	200 MB	Vistec	12		1/75	NA	NA	NA	NA
TOTAL						48,246	21,652	69,898	

GENERAL-PURPOSE COMPUTER CENSUS

Counts in the General-Purpose Computer Census are based on the best information available to IDC -- but are estimates nevertheless. Computer makers, as a rule, do not directly supply this type of data. General-purpose computers -- as characterized by IBM's 370, 303X and competitors -- comprise the bulk of digital computers by value. They are primarily character or byte oriented and programmed in higher-level language.

Instead of being pegged to constantly shifting average values, size classes are based on currently marketed IBM products and other manufacturers' models that compete with them, e.g., a computer in Size Class 7 would compete with an IBM 3033 or 168. (Other classes can be checked under IBM's column.) Note that many mainframe manufacturers also offer smaller systems that are included in the Small Business Computer Census. An "x" in the last column means none on order from the original manufacturer.





APPENDIX D

NARRATIVE AND CANDID (CLEAR TEXT) ANSWERS TO SELECTED QUESTIONS

INTRODUCTION

This section deals with actual, unaltered, answers provided to a series of narrative response questions, specifically, Questions 33, 51, 52, 67, 68, 90, 115, 127 and 159 of Part Two and Question 25 of Part Three (which has been renumbered 164 of Part Two) and answers that were provided to questions which were not multiple choice, specifically 1, 8, 9, 12, 28, 29, 69f, 83, 84, 93, 94, 96, 105h, 109, 118, 120, 133, 137, and 148. Also, gratuitously included, at the end of this section are relevant excerpts from correspondence the authors had with respondents and prospective respondents during the course of survey development and circulation.

The narrative response questions asked for opinions on how (or if) the surveyee would have done things differently had he to do them over again (lessons learned), or what form of research he would wish to see undertaken with an eye toward improving the lot of the project manager. Other non-multiple choice questions asked for answers for which the authors could not provide a possible set of answers because of the wide variety of possible answers.

Each discernible response, whether included in the following pages or not, has also been analyzed and coded to facilitate entry into the computer data base. Since this reduction of comment to code destroyed some of the richness of prose, the authors felt it worthwhile to include this "verbal" section in the report.

The answers as they appear in the following pages have been "cleaned up" to assure anonymity from the standpoint of author, firm, and project. Identical or nearly identical responses have been eliminated as have incomplete (incompleteable) sentences and one worders. With the exception of the "clean up" and correction of the most obvious spelling and punctuation errors, those responses included in the following pages are as received. Though they do not in every instance answer the question asked, they do relate to the subject. As an aside, we make no claim to total understanding of every response.

QUESTION 1 What was/is your position in relation to the project you are reporting on?

ANSWERS

The following answers are the various titles of personnel who answered the questionnaire (grouped as to their relationship to the project).

a. Project Manager

Project manager

Project leader

Project engineer

Section manager

Task manager

Responsible for computers system hardware and software

b. Software Project Manager

Data processing manager

Manager of software engineering

Manager of software development

Software development group leader

Central computer subsystem manager

Software manager

Responsible for the computer activities

Programming supervisor/mechanization lead engineer

Technical director and director computer programming

Group leader

Software design manager

Manager, data processing and software

Group leader - software development

Group leader - systems design

Lead software supervisor

Assistant, standard software development

Project manager for software

Associate program manager

Group supervisor

c. Project Manager's Supervisor

Supervisor of project manager

d. Project Individual

Analyst

Software engineer

Special assistant to the project officer

Technical advisor for software acquisition

Technical supervisor

e. Corporate Officer/Staff

Director

Director, quality assurance

z. Other Independent technical advisor

Project historian

QUESTIONS 8, 9, and 12 If the target (production) and/or host (development) computer for this software capability was an off-the-shelf commercial system give: a. manufacturer, make and model, and b. operating system employed.

ANSWERS

The first column gives the question number answered.

Question	Manufacturer	Make and Model	Operating System
9	IBM	370-125	DOS-VS
12	IBM	370-125	DOS-VS
8	LEC	System III	LEC MPOS
9	LEC	System III	LEC MPOS
9	ROLM	1603	None
12	ROLM	1603	None
8	IBM	370/158, 168	VS
9	UNIVAC	1110	EXEC 8
8	UNIVAC	9480	None
8	CDC	System 17	
9	CDC	System 17	
8	Raytheon	704	
9	Raytheon	704	
8	Varian	V76	VORTEX II
9	Varian	V76	VORTEX II
12	Varian	V76	VORTEX II
9	NANODATA DEC	QM4 PDP-10	As provided
12	NANODATA DEC	QM4 PDP-10	As provided
8	CDC	7600/7700	SCOPE
9	CDC	7600/7700	SCOPE
8	Honeywell	316	
9	CDC	6600	SCOPE 4.0
12	CDC	6600	SCOPE 4.0
8	DEC	11/20, 11/40	In-house
9	DEC	11/20, 11/40	In-house
8	IBM	370	
9	IBM	370	
8	IBM		DOS
9	IBM		DOS
8	CDC	3800	SYMON
8	SEL	8500/8600	RTM (modified)
9	SEL	8500/8600	RTM (modified)

Question	Manufacturer	Make and Model	Operating System
8	CDC	7700	SCOPE
9	CDC	7700	SCOPE
8	IBM	360/67	TSS
9	IBM	360/67	TSS
12	CDC	175	NOS
12	IBM	370-158	
12	CDC	6600	
	IBM	360/65	
8	DATACRAFT	6024/4	DATACRAFT
9	DATACRAFT	6024/4	DATACRAFT
12	DATACRAFT	6024/4	DATACRAFT
8	SCC	660	
9	SCC	660	
12	SCC	660	
8	XEROX	SIGMA-5	XDS
	INTERDATA	70	RBM
8	IBM	AP-101	Special purpose
9	IBM	360/75	OS/360
12	IBM		
8	Harris	Slash 5	
	IBM	360/370	
9	Harris	Slash 5	
	IBM	360/370	
12	Harris	Slash 5	
	IBM	360/370	
9	CDC	CYBER 72	
12	CDC	CYBER 72	
9	IBM	370-75	EOS
12	IBM	370-75	EOS
8	UNIVAC	1108	
12	UNIVAC	1108	
8	XEROX	SIGMA 5	RBM
9	XEROX	SIGMA 5	RBM
8	Hewett-Packard	2100	RTE
9	Hewett-Packard	2100	RTE
9	IBM	370/168	OS 21.6
8	INTERDATA	8/32	OS 32 MT
9	INTERDATA	8/32	OS 32 MT
8	Hewett-Packard	21 MX	RTE-11
9	Hewett-Packard	21 MX	RTE-11

Question	Manufacturer	Make and Model	Operating System
9	IBM	370-158	
8	UNIVAC	1108	EXEC 8
9	UNIVAC	1108	EXEC 8
8	IBM	360/75	OS (modified)
9	IBM	360/75	OS (modified)
8	UNIVAC	1108	EXEC 8
9	UNIVAC	1108	EXEC 8
8	IBM	370/168	SYS-IMS
9	IBM	370/168	SYS-IMS
8	CDC	6500	SCOPE 3.4
9	CDC	6400	SCOPE 3.4
12	CDC	6500/6400	SCOPE 3.4
8	CDC	CYBER 73	SCOPE
9	CDC	CYBER 73	SCOPE
8	CDC	3800	SYSTEM II B
9	CDC	3800	SYSTEM II B
8	IBM	360/65	OS/MVT with HASP
9	IBM	360/65	OS/MVT with HASP
8	DEC	PDP-11/45	RSX-110 VER 6A
9	Honeywell	6000	GCOS
8	UNIVAC	90/60	IMS-90
9	IBM	370-148	DOS/VS

QUESTIONS 28 and 29 In Question 28, it was asked - Was it necessary to rewrite the specifications before proceeding with design? And, if the answer was "yes", to specify the percent rewritten. Question 29 asked - If it was necessary to rewrite the specifications, what was the reason?

ANSWERS

The answer to Question 28 is placed in parenthesis before the answer to Question 29. The number is the percent of requirement specifications rewritten.

(20%) Clarification and resolve conflicts between specifications.

(Yes, it was necessary, but never done, design documents were changed.) Change of scope, inconsistency.

(Specifications were written along with design.)

(20%) Added scope.

(30%) Discussions with customer during their review of, or after, their approval of requirement specifications, resulted in major requirement changes, e.g., positive attendance reporting by optical sensing changed to excess reporting by batch.

(60%) Changes in hardware design and errors in specifications (80/20).

(60%) Clarifications and refinement of requirements.

(80%) Original requirements ambiguous and incomplete.

(50%) Changes in scope.

(Was reworked during design) Changes in the objectives and sequence to be employed in the system demonstration.

(95%) Normal and expected interaction of total system design.

(50%) Customers and internal project dialogue.

(20%, significant change traffic continued after design base-line frozen, all the way into qualification test. Resulting in about 20% change from original base-line design.)

(100%) Specifications absolutely unuseable - ambiguous, not testable.

(50%) Continuous Government redirection and program rescoping.

(50%) Customer requirements changed or expanded.

(15%) Refinement of performance of objectives.

(20%) Changing requirements and inconsistent specifications.

(50%) Lack of details; omitted many essential characteristics, especially interfaces.

(80%) To insure that the functional requirements were understood to permit further design.

(15%) Changing requirements.

(10%) Increased system knowledge.

(Small number of changes, but customer had some add-systems.)

(25%) Customer direction, mistakes, too much use of preliminary requirements.

(20%) System not fully understood.

(30%) Maturity of the requirements (block update).

(30%) To make the job [more] easily done or to overcome some difficulties which were identified later.

(90%) Incorporate specifics in place of functional requirements.

(25%) Changes directed by customer.

(50%) [changed from] Manual to computerized procedure of testing.

(100%) Additional technical insight.

(20%) Consistency and change in tactics.

(40%) System would not work.

(40%) Changes in scope, errors, lack of customer expertise.

(20%) Clarification and improvement.

(75%) Lack of sufficient detail.

(20%, 2 phase operation - existing operating system installed in first phase - no change - new operating system with new bells and whistles required, requiring approximately 20% rewrite due to learning curve response.) Customer became familiar with capability and customized to fit his particular need.

(100%) Only very broad requirements were furnished by user.

(100%, New specifications were written after the first design failed!) Total system was inoperative due to system (both hardware and software) design flaws.

QUESTION 33 If you could affect the method by which requirements are specified, or were able to initiate research into improving the requirement specifications function, what action would you take?

ANSWERS

Define a formal "requirements phase" whose output would be a contractor/customer agreed upon baseline for design work.

I would add dynamic simulation capabilities to a package like CARA-URL/URA or PSL/PSA.

Make sure it is a joint commitment and effort by customer and developers.

The method is relatively unimportant, unless the customer wants to impose a design. Otherwise, any readable statement of the requirements will do, as long as it is clear and complete.

Insure accessibility of key people to review specifications as to accuracy.

Establish incremental requirements development compatible with total project development.

Joint contractor/customer preparation of requirement specifications of all ICDs for agreeing to cost or schedule.

A more complete and relatively unbiased study should be made of various proposed techniques being advocated.

If possible, the system definition should be firmed up early so that the changes at the start of software development are only minor adjustments rather than redirection of the effort.

MIL-STD-483 is dismal in that the Part 1(b5) specifications outline calls for too much detail and actually obscures requirements. For example: An equation is not a requirement but merely a shorthand statement of a relationship. Most people don't know how to write a requirement specification. The usual result is a description of the process.

Intense interface with user community. In this case, the system was procured by one branch for use by another. The second branch was not brought into the picture until the acceptance phase - disaster.

Institute formal requirements methodology, testable and analyzable.

Promote more implementer involvement in specifications writing and more structured specifications.

More vigorous application of structured design.

Expand the team concept (vendor and customer) so that complete understanding may be fostered on both sides.

Coding should not proceed until requirements are complete. Requirements should be more complete and should be written (in part) by end users (mission operations team) in conjunction with customer/engineer/programmers.

Develop traceability techniques.

Require complete set of specifications before initiating software design and implementation. Use HOL source code as primary design document.

With respect to mission software, requirements should be developed jointly with the customer prior to contract award. This is perhaps the best possible way to go.

Improve communications between systems design groups and software project.

Requirements should be known early enough to allow time for review.

Requirement specifications should be prepared by users/operators/ development team. Keep teams small.

Invoke operation oriented description of performance requirements. Keep design detail out of requirement specifications.

More control to establish an earlier baseline.

Requirement specifications should be developed top-down with traceability at all levels.

Elimination of redundancy in documentations by making B-5 specifications first version of C-5 type specifications (Refer to MIL-Standard 490). Use Parnas' Hiding Assumptions list to define basis for choice of modules and for good user communications.

Involve software engineers early in the system definition and allow for more "up-front" simulation.

Insure that the user specifies the functions that the system must perform and that the developer obtains a full understanding of these required functions.

Improve organization of requirements hierarchy to facilitate top-down implementation.

I would revise MIL-STD-483 to limit Part 1 CPCI specifications to performance requirements and associated contractor/GFE interfaces, and include detail algorithm definition - equations (coding requirements) as a part of the Part 2 CPCI specifications.

More detailed system design specifications prior to start of software design.

Earlier system definition, and a software design freeze at some point during the development.

Would remove all intermediate agencies and monitoring functions from between the customer (user) and the analytical functional designer/ programmer.

Requirements should be verified as to "testability" prior to release. Also, contractors should be allowed to participate during source selection in the requirement specifications process.

Top-down documentation, with baselines, formal change procedures, and more involvement.

Extend the period of requirements definition; automate the analysis of requirements statements for completeness and consistency.

A detailed requirement specifications should have included a great deal of analysis, trade-offs, simulation (perhaps) before being started. A formal SRR should then take place. CM should be employed for all changes to requirements (on going), thereafter, or in other words: 1. Emphasize completeness/thoroughness of first detailed requirement specifications, 2. Be flexible for constant requirement changes thereafter - which may impact schedule; however, CM/CCB will decide.

Insist on complete identification of requirements and establishment of configuration control over them prior to proceeding to the next phase of development.

QUESTION 51 If you had total control of the planning function within your organization, or were able to initiate research into how to improve the planning function, what actions would you take?

ANSWERS

Increase the planning phase - complete detail design, prior to code initiation. Require full system walk-throughs.

Initiate more detailed level of planning. Improve cost and schedule estimates.

Based upon empirical data, I would initiate research which would result in the development of highly accurate cost estimating methodology for all phases of software development.

Careful planning, correct design, periodic review and testing. Verification and documentation should be necessary actions to be taken.

Increase system designers awareness of software during system design (trade-off).

More concentration on staffing and skill mixes.

Place more emphasis on the requirements of supporting resources (computer utilization, size, speed, etc.). Scope the development facility as to its adequacy to support the application.

Stop customer from freezing the design before detail coding (programming) requirements are complete.

Better staff training - better communications with systems engineering.

Combine all analysts/programming activities under one control group.

I would organize a highly proficient planning team from management and technical personnel to develop project plans.

Place a senior software specialist on staff in top management to assist in decision making.

Start planning earlier.

Assure that system definition and implementation allow adequate design and development time.

Devote more effort to planning. Involve programmers/analysts to a greater degree. Require full documentation of plan. Continue to review plan as development proceeds.

Various activities must be prioritized before detailed action is undertaken.

Emphasize involvement and contribution of the "people doing the work" in the planning function.

Allow more time for planning.

Design tools for building emulators.

Analyze applicability of the University of Michigan System Design Language.

Survey available methods; apply most promising and weed out losers.

Allocate greater percentage of the time to planning.

Set up data base from all ongoing programs which would be available to new programs.

Reduce the number of people and increase the calendar time.

Set means to provide total access and communication with existing in-company experience.

Expand the coverage and contractual significance of the computer program development plan CPDP as defined in AFR 800-14. Insist that a CPDP be outlined during the competitive phase to assure a credible bid (fixed price plus incentive).

Require top level software design and module interface specifications prior to detail software design.

Early system definition and software design freeze.

Capture data from ongoing programs. Transfer knowledge/techniques among projects, i.e., standard planning, measurements, reporting and estimating techniques.

Complete detailed development plans and procedures early in the project.

Demand that validated project management procedures be employed.

More senior management personnel should be involved.

Collect software metrics on productivity and quality.

Increase user involvement in designing and testing phases.

QUESTION 52 If it were in your power to make changes in the way technical decisions are made concerning programming techniques, test procedures, documentation standards, etc., what action would you take?

ANSWERS

More emphasis on modern structured technique and automated tools.

Get dollars, survey available methods, apply most promising and weed out losers.

Study and evaluate variety of modern, automated techniques to be ready for appropriate application.

I would prevent outside "experts" from imposing their pet techniques and controls in areas where they are inappropriate, misguided, and costly.

Use more junior programmers for trivial aspects of the job.

More emphasis on phase design effort and better planning for testing. Development of more test aids such as program flow and structure analyzer and aids to the programmer for fixed point machines as long as we continue to use fixed point for flight equipment.

Review what's in general use and publish recommended methods as a standard. No such document currently exists.

More detailed plans must be made and reviewed before actual coding begins. Short range goals must not be allowed to dominate planning function.

Use standard industry techniques for flight software development.

More automated tools, more formal walk-throughs.

Pass all "technologies" through technical control panel for assessment prior to use on project.

Greater standardization throughout the project. More rigid monitoring and enforcement.

Have more desk checking.

Develop design validation techniques.

Select one able, right person (who has experience in programming techniques, as well as management) to be program manager. Give direction and guidance concerning objectives, procedures, schedules, etc. (other necessary actions). The program manager will take care of the rest.

Increase programmers' awareness of their importance, and the importance of their professional demeanor.

I would improve the entire spectrum of project standards to be enforced.

Structured programming concepts and chief programmer.

More top-down structured design.

Insist on a common language where practical. Include test requirements as an integral part of the requirement specifications.

Simplify the number of different standards in use.

I would give additional impetus to all aspects of testing, giving it equal status with other major phases of software development, allocating perhaps 40% of project budget to this activity. I would insist upon certain standards associated with documentation content, but relax format considerations.

Increased formalization of techniques. Too much "by the seat of the pants" planning, dicision making takes place. Much of this is due to "the first time" problem - remaining due to an unstructured environment.

Select a simple set of rules for program organization and structure and concentrate on making programmers follow them.

Assure that past experience and techniques are considered. Document rationale for all decisions.

Set means to provide total access and communication with in-company experience.

Eliminate requirement for detailed flow charts prior to coding.

Use self annotating listings in lieu of flow charts.

More reviews, walk-throughs and configuration management procedures.

Follow more structured software development approaches. We are planning to do this for our FDC delivery.

QUESTION 67 Which of the many forms of project organization do you feel contributes the most to the success of the project?

ANSWERS

Best organization is dictated by the job to do, [and] the talents of specific people available.

Matrix.

Task oriented.

Single clear leadership role.

The lead programmer, single architect approach.

Direct control, multi-function, integrated program/analyst/manager teams.

Matrix, with strong technical leadership.

Each form has appropriate application under different conditions, constraints, and objectives.

Management by personnel who understand both technical and administrative areas.

Program manager and a technical manager.

Project organization.

Line organization.

A changing organization that adapts to the work being performed.

Line organization responsible for all programming functions.

Matrix organization for overall ADP organization - structuring and dedicating project teams to individual projects.

Chief programmer - acts as interface from line organization into the rest of the matrix.

Team organization.

Line organization with three independent sub-groups; requirements/analysis, programming/software system design, and test.

Mixing of disciplines at the lowest level.

Systems - subsystems by functional areas.

Matrix.

One in which the project manager has both programming and technical responsibilities with permanent assignment of personnel.

A project manager with full authority for the project. Use of a chief programmer subordinate to the project manager.

QUESTION 68 If you had it within your power to make one change in the way the project was organized, what action would you take, or if you had resources available to undertake research in any area of project organization which aspect would you explore?

ANSWERS

Better planning.

More planning.

Visibility of project status.

Doesn't really require any research. Matrix or functional will work equally well depending on the size of the project.

Implement the team approach with the programmers, back-up programmers, and librarians as identifiable entities.

The extent to which technical and administrative functions should be separated should be explored.

Permanently assigned staff for duration of project.

More technical staff direction.

Implement a separate test function at project initiation. Create a separate documentation function.

Would explore planning (scheduling) and testing organization.

Provide sufficient calendar time for each group to complete its task without overtime. Particular emphasis must go on requirements and specifications.

Metrics; so we talk less and know more.

I would spend the necessary amount of time thoroughly researching available empirical data to arrive at the most accurate possible methodology for estimation of software development cost (all phases).

Software activities report to higher level within project.

Use chief programmer teams.

Would place hardware and software totally subservient to system.

Include a separate software interface team (a group responsible for the top level software design).

Would employ separate software test team that is not under control of the software manager.

Program status/productivity measurement aids; automated configuration management aids.

Assign a thoroughly experienced project leader at the very beginning. Validation of proposed project management methods.

No changes in organization. There were some things the organization should have done differently.

Assign stronger technical personnel to lead task manager positions.
I wouldn't have had a personnel cut just prior to the effort.

QUESTION 69f The project manager was appointed, or selected for this project by:

ANSWERS Grouped by relationship to project manager.

a. Senior ADP Manager

Senior ADP manager through experience

Assistant manager, engineering operations

Manager, software development laboratory

Senior ADP manager

Project reviewing authority

The project review authority as delegate of division general manager

Division general manager (V.P.)

ADP manager

Line manager

Manager two tiers up

Support organization manager with the approval and concurrence of the program manager

Line manager for software

Senior line ADP manager

Assistant director business systems development

Director of operations

Functional section chief

Department manager/Division manager

Department chief

b. Senior Non-ADP Manager

Director of development

Director of engineering

Avionics chief engineer

Director

Line organization

Department management

Department head

The avionics manager

Systems project engineer

Project engineer

Section chief

c. Program Manager (as opposed to project manager)

Program manager

The program manager of the total project

d. Senior Corporation Officer

Vice President

President

Senior management

Program Vice President

Upper management selection

Company general manager

The division vice president for Federal Systems

He was appointed by top level management

Assistant vice president

The line executive

e. Customer

Customer

SPO chief

f. Other

Ex officio

Agreement between line and staff management

QUESTIONS 83 and 84 Question 83 asks what percent of the programmer/analyst staff were originally computer operators who moved directly from machine operations to programming. Question 84 asks if the former operators make successful programmers.

ANSWERS The answer to Question 83 - the % of operators who became programmers - is in parentheses before the answer to Question 84.

(0%) Very, if they get the BA or BS required for the promotion.

(5%) The transition from operators to programmers was very successful, especially in the area of JCL procedures.

(0%) In scientific programming area there has been less chance for machine operators to become programmers. I haven't seen any.

(10%) Yes, the Best!!

(10%) Yes, and their familiarity with OPS problems and procedures was useful.

(0%) We have used this technique in other areas of the matrix organization - usually they work best in an operation-system maintenance function - i.e., recurring versus design.

(1%) One did.

(15%) Average in quality.

(0%) Avionics work emphasizes engineering skills, not programming skills.

(UNK) I remember one who turned out to be very good.

(4%) Yes, good/average.

(5%) Yes, but limited in scope.

(55%) 2 proficient
1 mediocre
2 incapable

(2%) Yes, their long experience as operators on these systems and their knowledge of policies help them.

(5%) Yes.

QUESTION 90 If it were within your power to make any changes, or initiate any research in the area of staffing, what would you consider the most fruitful area for modification or study?

ANSWERS

How to maintain/improve communications.

Experiment with more specialized staffing; i.e., with a number of more functional roles rather than a group of programmers/analysts.

Investigate what personnel backgrounds lead, or tend to lead, to high performance ADP personnel.

Use different categories of programmers with different levels of expertise for appropriate aspects of the project.

Have a sufficient number of "open ended" research and sustaining programs to serve as buffers for personnel so as to provide more flexibility in staffing.

Staff should not build up too fast. Pure, high-level people for initial design might be best.

Majority of the problems encountered involved outside pressures - such as removing personnel for short periods to handle brush fires - matrix organization has solved that problem. Matrix organization has also improved overall training program which now takes place in a functional area - eliminating much pressure from the individual projects.

Study the number of librarians required for a job of a particular size.

Need better method of evaluating background/experience vs project requirements.

Training in design techniques.

Add programmer aid or support librarian to the team.

More formal traiing in the engineering applications.

Training in new technologies.

Identify the quality and training requirement of persons to be hired early in project start-up.

I would like my team members to get well trained if anyone is in need of it.

Staffing for an evolving project, i.e., soft schedule.

Personnel screening techniques to minimize the on-the-job-training.

Replacing personnel.

Software staffing must include a cross section of personnel types. Hardware/Software background vs software only, experience vs youthful ideas, etc. - Study to determine the factors which most affect the proper mix for a given project.

The balance of young to old and experience to inexperience.

Participate in personnel selection.

When you are in trouble a programmer is not a programmer if he doesn't know anything about the hardware and/or software to be developed.

Back to the drawing board.

Measurement of productivity and correlation with selection factors.

QUESTION 93 Which manual reporting procedures were used in project monitoring and management? At what level did they originate, and how high did they go? How often were they aggregated, condensed, or edited as they moved up the chain?

ANSWERS

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity	Worker	Proj mgr	2
Proj status	Sect mgr	Proj mgr	1
Significant chg	Proj mgr	Proj mgr	-
Wkly Activity	Programmer	Proj mgr	3
Wkly Activity	Sect head	Proj mgr	1
Proj status	Proj mgr	President	2
Wkly Activity	Proj leader	DP Admin Chief	-
Proj status	Proj leader	DP Admin Chief	-
Wkly Activity	Anal/Prog	Gen mgr	2
Proj status	Mgr	Gen mgr	1
Wkly Activity	Programmer	Gen mgr	3
Proj status	Ld Prog/Anal	Gen mgr	3
Significant chg	Programmer	Proj mgr	3
Wkly Activity	Programmer	Division VP	1
Proj status	Sr Anal	Division Pres	3
Wkly Activity	Programmer	Proj mgr	1
Proj status	Proj mgr	Sr mgmt	1
Significant chg	Tech leader	Sr mgmt	1
Wkly Activity	Prog/Anal	Proj mgr	2
Proj status	Prog/Anal	Proj mgr	2
Significant chg	Tech leader	Proj mgr	2
Wkly Activity	Programmer	Proj mgr	0
Proj status	Proj mgr	Division mgr	2
Wkly Activity	Programmer	Proj engr	0
Proj status	Proj engr	Cust/Div mgr	2
Cost vs Performance Rpt	Fin Anal	Proj engr	0
Wkly Activity	Programmer	Software engr	0
Proj status	Software engr	Computer sys mgr	0
Wkly Activity	Branch Chief	Director	
Proj status	Branch Chief	Director	
Significant chg	Branch Chief	Director	
Wkly Activity	Gp leader	VP	4
Proj status	Proj engr	VP	3
Significant chg	Proj engr	VP	2

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity	Subsys mgr	VP	1-2
Proj status	Subsys mgr	Customer	2
Significant chg	As required		
Wkly Activity	Lead engr	Proj mgr	4
Proj status	Proj mgr SW	Proj mgr	2
Significant chg	Proj mgr SW	Proj mgr	2
Wkly Activity	WPM	Proj mgr	1
Proj status	WPM	Customer	2
Wkly Activity	Prog/Anal	Proj mgr	
Proj status	Prog/Anal	Proj mgr	
Significant chg	Prog/Anal	Proj mgr	
Wkly Activity	Programmer	Proj Officer	
Proj status	Programmer	Proj Officer	
Significant chg	Programmer	Proj Officer	
Wkly Activity	Proj mgr	Engr VP	4
Monthly status	Proj mgr	Division Pres	5
Proj status	Sect head	Proj leader	Wkly/Mo reported
Monthly CSCS/R	Funct engr	Proj mgr	
Wkly Activity	Team chief	Programmer	1
Proj status	Team chief	VP	2
Significant chg	Team chief	VP	2
Wkly Activity	Programmer	Proj mgr	0
Proj status	Chief Prog	Proj mgr	0-1
Wkly Activity	Staff	Program mgt	0
Proj status	Program mgt	Customer	0
Significant chg	Staff	Proj mgr	0
Proj status	Programmer	Program mgr	
Significant chg	Programmer	Program mgr	
Wkly Activity	Supvr (gp engr)	Proj mgr	2
Proj status	Prog Cont org	VP	1
Significant chg	Mgr	Proj mgr	2
Wkly Activity	Designer	Customer	
Proj status	Designer	Customer	
Significant chg	Designer	Sys prog mgr/cust	
Wkly Activity	Programmer	Dept head	
Proj status	Prog cont officer	Site director	
Significant chg	Funct dept head	Program mgt	
Wkly Activity (wkly prog rpt)	Gp leader	Program mgr	3
Proj status	Programmer	Gp leader	1

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity	Gp leader	Prog director	5
Proj status (monthly rpt)	Gp leader	Customer	6
Wkly Activity	Branch prog	Dept head	1
Proj status	Proj mgr	Dept head	0
Significant chg	Proj mgr	Dept head	0
Wkly Activity	Prog/Anal	Top mgr	3
Proj status	Prog/Anal	Top mgr	3
Wkly Activity	Individual	President	6
Proj status	Team leader	President	5
Wkly Activity	Chief prog	Proj mgr	1/wkly
Proj status	Proj mgr	President	
Wkly Activity	Gp head	Proj mgr	0
Proj status	Proj mgr	AVP	1
Significant chg	Proj mgr	AVP	1
Wkly Activity	Gp head	Program mgr	2
Proj status	Gp head	Program mgr	2
Significant chg	Individual	Sect head	1
Wkly Activity	Sect head	Program mgr	1
Proj status	Sect head	Program mgr	1
Significant chg	Sect head	Program mgr	1
Proj status	Cog engr/cog prog	Sect chief	
Significant chg	Cog engr/cog prog	Sect chief	
Proj status	Cog engr	Proj mgr	1
Wkly Activity	Gp leader	VP	1
Proj status	Proj mgr	VP	1
Significant chg	Proj mgr	VP	1
Wkly Activity	Team as input by individuals	Program mgr	1
Proj status	Team	DOD/ADP VP	3
Significant chg (schedule variance)	Team	DOD/ADP VP	3
Wkly/Mo Activity	Programmer	Proj mgr	0
Proj status	Prog mgr	Division mgmt	
Wkly Activity	Indiv contrib	Proj mgr	2
Proj status	Work unit ldr	Proj mgr	1
Significant chg	Work unit ldr	Proj mgr	1
Proj status	Proj mgr	Directorate	1
Wkly Activity	Branch	Director	
Proj status	Division	President	
Significant chg	Division	President	

Report Title	Lowest Originator	Highest Recipient	No. of Aggs/Edits
Wkly Activity	Task mgr	Dept mgr	1
Proj status	Task mgr	Division mgr	1
Significant chg	Task mgr	Division mgr	1

QUESTION 94 Which automated reporting systems were used in project monitoring and management?

ANSWERS

System	Lowest Originator	Highest Recipient
Manhour/Activity	Worker (time card)	Proj mgr
Manhour/Activity	Programmer	Proj mgr
Manhour/Activity	Lead programmer	Proj mgr
Manhour/Customer	Programmer	Next level above proj mgr
Manhour/Activity	Programmer	Proj mgr
Manhour/Activity Manday/Task	Prog analyst Prog analyst	Proj mgr Proj mgr
Manhour/Activity Manday/Task	Accounting Accounting	Proj mgr Proj mgr
Manhour/Activity Manday/Task	Fin analyst Fin analyst	Proj engr Proj engr
Manhour/Activity	Software engr	Computer subsys mgr
Manhour/Activity Manday/Task	Engineer Engineer	Program mgr Branch chief
Manhour by major activity		
Manday/Task	Individual	Cumulative to VP
Manhours/WBS Task	Computer report	Proj mgr
Manhours/Task	Prog/analyst	Proj mgr
Manhour/Activity	Functional engr	Proj mgr
Manhour/Activity	Individual	Prog cont org
Manhour/Activity Manday/Task	Programmer Prog control officer	Proj mgr Prog mgr
Manhour by job charge (this is related to broad tasks such as programming, subsystem equipment design, etc.)	Programmer	Prog mgr
Manday/Task Manhour/Job charge	Group leader Programmer	Proj engr Programmer
Manhour/Job charge	Programmer	Programmer
Manhour/Job charge	Programmer	Prog mgr

System	Lowest Originator	Highest Recipient
Manhour/Activity	Sr programmer	Dept head
Manday/Task		Prog mgr
Manhour/Activity	Time card, WBS	Proj mgr
Manday/Task	Team members	ADP VP
Cost data	Time cards by individual	Division mgr
Manhour/Activity	Individual	Staff
Person-Hour by Function	Integration	Proj mgr

QUESTION 96 List productivity indexes such as lines of code, program errors, sources of errors, turn arounds required per completed task, etc., that were employed in monitoring performance.

ANSWERS

Documented pages, threads, computer time used, problem reports/ corrections, lines of code.

Lines of code - tracked; not absolute measures.

8 lines of code per day.

Productivity monitored at module level, since lines of code per module were constrained by standards. Complexity factors weighed in. Performance then evaluated on turn-around, correctness, efficiency.

Lines of code, number of compilable units.

Lines of source code, number of modules.

Lines of completed code/per manhour.

Lines of code, error reports, machine time utilization.

Program errors.

Lines of code, program errors, sources of errors, turn-arounds required per completed task.

Modules completed, lines of code.

We indeed use such indexes. We are currently establishing a data base of such indexes.

Lines of checked out and documented machine executable code per hour.

Lines of code.

Rate charting for module productivity.

Program errors and lines of code.

Dollars/lines of operational, documented software.

Unfortunately - none.

Did not use productivity indexes.

Lines of code.

QUESTION 105h What was the title, position, and affiliation of the chairperson of the formal reviews?

ANSWERS Grouped by relationship to project

a. Project Manager

Manager ADP

Project manager

Computer subsystem manager

Data processing manager

Software manager

Group leader or project leader

Project manager or person appointed by him

SE/TD project manager

b. Senior ADP Manager

Director

Director computer programming

Software program design manager

Department head

Director to chief

Department manager for software

Software division manager; reported to the program manager.

c. Senior Non-ADP Manager

Director

System engineer for the system of which a given software product was part.

d. Customer

Project engineer (customer)

Customer project manager

e. Technical Director

Technical director

Technical leader

Systems engineer

Systems engineer, contractor Assistant Project Manager

Lead software engineer

f. Corporate Staff

Vice President and general manager

Management analyst, Integration/control office of mission group.

g. Varied

Varied - reviews generally chaired by prime contractor

Varied

Depends upon the level of the review

Varied from vendor representative to Director of Related Systems functions

h. Review Board

Design review board chairman, systems engineer

Review chairman

Director, Quality Assurance - Reporting to company president

QUESTION 109 Give title, position and affiliation of chairperson of Configuration Board.

ANSWERS Grouped by relationship to project

a. Project Manager

Program manager

Project manager

Project leader

Project manager assigned a senior person

Project manager of project

b. Software Project Manager

Computer subsystem manager

Software controller

System engineer for the system to which a given software product was a part

c. System/Functional Project Manager

Manager, Systems Engineering (contractor)

Deputy for Operations, program office

Manager, avionics officer

System project engineer

Director of Engineering

Systems engineer for the system of which a given software product was a part

Systems Engineering manager

d. Senior Technician

Chief engineer

e. Corporation Staff

Mr. John Doe

f. Configuration Management/Product Assurance

Software product assurance manager

Configuration management manager

Configuration control board representative

Program charge review board chairman

g. Customer

Project engineer, customer

Joint customer-supplier chairmanship

QUESTION 115 If it were within your power to make any changes in the method or procedures followed in controlling this project what would these changes be, or, if you had resources available to undertake research in the area of planning which aspect would you explore?

ANSWERS

A standing review committee would be established for each project with critical points designated for technical reviews.

Don't apply - T-specifications or CSSR to software development project.

Allow time for an orderly approach to design and design reviews.

Establish definite packages of work and affect regular reviews with milestones.

Schedule walk-throughs. Hold additional formal reviews.

Provide more detailed breakdown of task and associated milestones, effort estimates, etc.

Complete top-down design with walk-throughs.

Keep records of time by activity. Document changes more formally.

More formal design reviews for different levels of software/engineering activities.

Formalize coding standards - loosen up on 50 lines of code per program.

Development of automated procedures would be of assistance.

More tools.

More effective ways to estimate impact (cost, schedule) on new change requests.

Formal configuration management, improved software library and link system.

Earlier configuration control, base-lined, software requirements.

More strict adherence to base-line with schedule modification (or at least review) for all changes beyond base-line.

Would minimize involvement of the agencies and departments who have the capability to restrain yet do not have potential to advance development (work) efforts.

Use walk-throughs.

Start CM procedures - for this project it started the second time around (design context) after four project managers had their chance to get it up.

Aids permitting automatic collection of development status data, without requiring frequent input from individual contributors.

Configuration management with change control, baselines, etc.

Institute formalized project control procedures including full range of documentation and management configuration control from concept through implementation and follow on maintenance.

QUESTION 118 The title and position of the project manager's supervisor was:

ANSWERS Grouped according to relationship to project manager

a. A Senior ADP Manager

Chief, Data Automation Branch

Chief, Digital Applications

Manager, Software Systems Development Department

Operations manager, project review authority

Operations manager, software systems operation

Chief, Scientific Applications Branch

Branch head, Programming Techniques Branch

Software Engineering Division leader

Four group engineers or supervisors in charge of software engineering, applications software systems and display, software and data systems test, and integration

Director - site facility

Department manager

Department head - systems programming

Director computer center

Director, software development

Department manager - third level supervisor

Assistant director - Business systems development

Director, Operations

Computer system officer

b. Senior Non-ADP Manager

Operations director

Director of development

Director of engineering

Assistant manager, Engineering Operations

Manager, Systems Analysis Department

Avionics chief engineer

Manager engineering

Considering the software group leader as project manager, his supervisor was Systems Group supervisor

Senior director

Chief engineer

b. Senior Non-ADP Manager

Manager, Avionics Systems
Section manager
Program/Component manager
Department head
Avionics manager
Branch head
System project engineer
Project leader
Engineering project leader
Project engineer - development manager
Director
Engineering supervisor
Manager development engineering
Section chief
Section manager

c. Program Manager (as opposed to project manager)

Program manager
SPO chief
Matrix - Program manager
Computer Laboratory Manager

d. Corporation Officer

Program Vice President
Vice President
Vice President Federal Systems Divisions

QUESTION 120 This question reports the title and position of people reporting directly to the project manager. However, very few surveyees completed the POSITION answer of the Question. It was felt by the authors that this indicated that the title a person had was also his position.

ANSWERS This is the only place the clear text answers to Question 120A and 120B appear. The tabulation sheet "blurs" the different titles used by the project personnel. The answers to Question 120g appears in parenthesis under the last number.

Title	Position	Number
Mgr, Systems Engr	Section mgr	1
Mgr, Programming	Section mgr	2
Mgr, Integration & Test	Section mgr	1
		(4)
Technical Director		1
Section supervisor		1
		(2)
Technical Director		1
Manager		4
		(5)
Analyst		3
Programmer		7
Typist		1
Librarian		1
		(12)
Senior Prog/Analyst		5
Support Supervisor		1
Secretary		1
Programmers		12
		(20)
Systems engineers		5
Hardware engineers		22
Software engineers		3
		(30)
Senior project analyst		1
Programmer analyst		3
		(4)

Title	Position	Number
Project analyst (ours)	Chief programmer	3
Project analyst (ours)	Technical coordinator	1
Programmer/analyst (ours)	Team programmer/analyst	1
Analyst (cust)	Team programmer/analyst	4
Programmer (cust)	Team programmer	7
		(20)
Senior project analyst		2
		(17)
Associate engineer		4
Engineer		6
Senior engineer		2
		(12)
Senior engineer		4
Engineer		7
Associate engineer		3
Librarian		1
		(15)
Computer hardware		1
Avionics Interface hardware design		1
Computer SW designer		1
		(3)
Software engineering	Manager	20
Software development	Manager	35
Computer operators	Manager	30
Plans/controls	Manager	10
		(95)
Engineering specialist	Level 25	5
Engineering specialist	Level 27	2
		(8)

Title	Position	Number
SW development		1
SW Programmer/analyst		1
SW Configuration mgn		1
SW engineering		1
Administrator		1
		(5)
Senior analyst		1
Programmer		2
Engineer		2
		(5)
Task leader		2
Engineer		2
Programmer		2
		(6)
Assistant Project manager		8
Secretary		4
		(12)
Mathematician	Analyst/programmer	1
Mathematician	Administrator	1
Mathematician	Tester	1
		(4)
Head SW engr (ours)		1
Head SW engr (Contractor)		2
Programmers		3
Librarian		1
Analyst		1
		(8)
Managers		6
Deputy director		2
Staff assistants		4
		(12)
Technical director		1
Team chief		7
		(8)

Title	Position	Number
Program analyst		10
		(10)
Engineers		25
		(25)
Group engineer	SW engineering	1
Group engineer	Applications SW	1
Group engineer	Sys analysis & display SW	1
Group engineer	Data sys test & integration	1
Secretary	Secretary	1
		(6)
Software requirements	Supervisor	6
Flight/Mission SW design	Supervisor	11
Automatic test equip SW design	Supervisor	10
Software product assurance	Supervisor	8
		(35)
Manager - system		1
Manager - application		1
Manager - verification		1
Manager - program control		1
		(350)
Data analysts		10
		(10)
Programmer analysts		10
		(10)
Junior programmer		1
Programmer		1
Asst Engineer/Programmer		1
Assoc Engineer/Programmer		1
Engineer/Programmer		2
		(6)
Functional team leader		3
Programmers		7-9
		(10-12)

Title	Position	Number
Analyst		6
Programmer		2
Lab integrator		4
Aircraft operations		3
		(20)
Design head		1
Programming head		1
Test team head		1
Chief analyst		1
		(4)
Project SW manager	Line supervisor	15
Test engineer	Line supervisor	15
System engineering	Line supervisor	10
		(50)
Senior engineer		4
Specialist		1
		(15)
Member Tech Staff		3
		(4)
Section heads		3
Group heads		8
Technical staff		3
Programmer/librarians		41
		(55)
Secretary		0
Programmers	Member tech staff	3 teams of 2, 3, 4 people each
Test/integrators	Member tech staff	3
Project manager	Member tech staff	1
		(15)

Title	Position	Number
Programmer/analysts		20
		(20)
Group leader		3
		(12)
Supervisor	Applications supervisor	1
Hardware analyst	HW evaluation & install	2
Data base analyst	Install data base design	2
		(35)
Gp leader - applications		1
Gp leader - systems programmer		1
Gp leader - HW engineer		1
Gp leader - Standard systems		1
		(approx 32)
Programmer		
Analysts		
Computer specialists		(100+)
Deputy Project manager		1
Task managers		6
Project secretary		1
		(8)
Deputy project manager		
SW Division manager		
Systems Engineer manager		
Operations manager		
		(50)
Computer specialist	GS-12	4
Computer specialist	GS-11	5
		(16)

Title	Position	Number
Senior programmer		1
Advisor programmer		1
Staff programmer		6
Senior associate programmer		4
Advisor analyst		2
Staff analyst		9
		(29)

QUESTION 127 If you had it within your power to implement changes in the way this project was directed, or had the resources to devote to research in this area, what action would you take?

ANSWERS

Greater delegation of authority, responsibility. Clearer assignment of responsibility.

Obtain a better match between the experience of the personnel and the requirements of the project.

Perform basic research in software lifecycle cost.

Less centralized control by the project manager.

Increase control/interaction with functional group developing the company proprietary software.

Delegate more to technical subordinates.

More resources devoted solely to highest level project management.

Would add more formality to the line organization.

Assume a knowledgeable and competent project manager was assigned during the entire project life.

QUESTION 133 What, if anything, could the project manager have done to improve his ability to meet the schedule?

ANSWERS

Insisted on a formalized system of changes.

Firmly establish methodology/design before implementation.

Have authority over all phases of the program, not just software.

Insisted on firm baseline.

Insist on firm baseline after the requirements phase.

Nothing - requirements changes are vehicle orientated not software.

Have a better estimate of the job initially.

Use basic management techniques and employ more $ and people - early.

Better original estimate. Negotiate schedule change with each requirement change.

Restrict number of modifications and suggestions allowed.

Enforce structured code walk-through earlier.

Bid more manpower, in particular in software documentation to meet milestone - Progressive build up of the software product specification.

An earlier agreement on the definition of system requirements.

Improve support received from other organizations - on time delivery of target computer and hardware test beds.

Should have had formal documentation milestones/software management plan.

Stick with basic requirements except where a change is required to meet basic requirements. Changes to basic requirements should be reviewed for schedule impact instead of being done with much O.T.

Minimize number of changes and design objectives.

Overstaff initially to provide trained cadre for the accelerated schedule to come later.

Delay other projects.

Baseline requirements, improve computer access, enforce better design quality standards, enforce more structured programming standards.

Better monitoring and application of resources.

Better monitoring and testing.

Respond to the early warning signals with more aggressiveness and alacrity.

Improve test approach, better control of project resources, increased involvement of true user community, better control over all elements of the project (i.e., company developed proprietary package).

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Little requirements or de-scope implementation.

Good software engineering techniques were not used the first time around.

Baseline requirements and ensure that the user is involved and documents the proper test procedures.

QUESTION 137 What, if anything, could the program manager have done to improve his ability to meet the budget?

ANSWERS

Provide more visibility to the impact of changes in order to reduce requests.

Better initial estimate. Firm establishment of methodology design before implementation.

Maintained lower staffing profile until requirements were more firm.

Realism on the part of the customer was an absolute necessity but was not a reality.

Better estimates, better style, better subcontract.

Nothing.

Better initial estimate.

Restrict number of modifications and suggestions allowed.

Freeze baseline.

Bid more realistically.

Bid correct cost in first place. (The program manager at the top can do as ours did. If he does not cut too deep, one element may overrun, but whole project would be on or under cost.) Apply modern software design techniques.

Phase staffing. Plan the staffing to be commensurate with the development activities.

Delete documentation requirements.

Take a harder approach with the customer to make his requirements more firm and more unified.

Allow contingency, indirect rate changes.

Baseline requirements and ensure that the user is involved in and documents the proper test procedures.

Limit requirements or de-scope implementation.

Update projections based on experience rather than wishes.

Closer review of design.

Better accounting procedures, baseline requirements, improve computer access, enforce better design quality standards, enforce more structured programming standards.

Earlier definition and freezing of requirements. More pressure on customers to supply requirements and limit them.

Act more aggressive toward demanding test plan earlier and to a more detailed level.

Improve test approach, better control of project resources, increased involvement of true user community. Better control over all elements of the project (i.e., company developed proprietary package).

Delayed staffing, thereby missing initial milestones which later proved to be misdirected.

QUESTION 148 Was the delivered system useable? If so, how was this determination made?

ANSWERS

Yes - After fleet training, system went into operation and replaced previous system.

It was deemed useable by a complete user evaluation and test at his site.

Yes - Company and customer demonstration during development phase.

Accepted by user as operational.

In operation, supporting system evaluation and fleet exercises since 1974.

Yes - test.

Presently being determined.

System has been used in demonstrations but not delivered to users.

Capable of performing task for which it was designed.

Technical and operational testing in the field.

System not yet delivered.

Not yet completed.

[it] Is in production; [it] is being used by non-computer types on daily basis.

Yes - operational field tests.

Not yet delivered.

Through use.

Real system tests using live data. Data evaluation showed system met requirements.

Ability to check out and fly the vehicle without conscious effort to "deal with" the problem.

Combined DT&E/IOT&E.

Flight test.

The user ran the system.

Demonstrating the use.

Passed the designed tests.

Independent testing by several agencies before delivery followed by monitoring of full use.

Yes, through testing by independent contractor and operational usage.

Yes - review of operational utilization.

No, did not respond fast enough to user demands.

Yes, demonstrated integrated operation in complete weapon delivery system.

It's still in use.

Availability factor to support active flight test programs.

Yes, it satisfies the user (requirements).

Yes, it was subjected to an operational test by the user.

Presently being used.

Yes, continued use by customer.

Flight test.

Satisfying the avionics integration requirements - hardware and software working together.

Through testing and verification.

Not determined.

Turn key system used for factory/depot testing designed for manufacturer, machine interface, etc.

Customer field tests.

Demonstration.

Through operation.

Field exercises in competition with another customer's systems.

Customer was satisfied.

Yes, used for both launches - but painfully!

System was usable, but not up to expectations of users.

The user group used for daily operations. Prior systems were scrapped day I.

Still in final system acceptance testing.

By the users "real" application, immediately after delivery.

Product test with user involvement.

The jury is still out.

QUESTION 159 Give some lessons learned from this project.

ANSWERS

Delegate responsibility and authority: maintain communications.

The interface with an IV and V contractor is much more time-consuming than estimated. Customer interface at a detailed level is costly.

Must have well defined, fall-back position to go to if problems develop. Must hold line on new suggestions and changes introduced.

Make sure development/test tools are ready; automate the process as much as possible.

Establish requirement clearly before designing; establish design clearly before programming. Give more attention to planning and effort/cost estimates. Need greater documentation of decisions, specifications, and design.

Careful building of requirement specifications to facilitate testing pays off, configuration control pays off, integrated engineering/programming team pays off.

Must have firm base line; good documentation of higher levels of effort must precede lower levels of effort.

Sound management (a la hardware projects) works well with software projects.

Streamline requirements before software development.

Good foresight and planning very essential.

Good management goes a long way. Do front end work well, get a good sub-contractor and good sub-contract. Develop good management visibility too.

You assume you know the project managers main goal!! in Question 158. [To deliver on time, within budget, and meeting the requirements of the system, where the final software product is reliable, maintainable, and useable.] If the contract has been properly written (an incentive contract), the project managers objective is to maximize profit! If he does, the customer should be happy because the contract will have steered the project manager and the customer wrote the contract! If there is no requirement that the software be reliable, maintainable and/or useable, the project manager should not have these as a major goal. On time, yes! Within budget, yes! Meeting requirements, yes! But more than that not necessary. Sometimes though, contracts are not written to reflect the true desires of the customer. Therefore, when project manager goes to maximize profits, the customer is not necessarily happy!!!

1. Documentation and flow charting more expensive than thought. 2. The average software designer fails to see the need for documentation or discipline until job is near completion. 3. Documentation, discipline, good configuration management, sound planning, detailed schedule commitments, software design standards, error tracking, top-down design and combined top-down/bottom-up testing pays off.

More strict monitoring and enforcement of standards and roles is needed.

Enhanced programmer professionalism is extremely important. Need better reporting mechanism. Need automated means of monitoring programming and design progress.

1. Require intense interface with user community. 2. Increase the planning phase. 3. Complete detail design prior to code initiation. 4. Require full system walk-throughs. 5. Increase formalization of planning. 6. Do not build test team from original project personnel to transition to a testing function. 7. Dedicate project teams to individual projects. 8. Implement a separate test function at project initiation. 9. Create a separate documentation function. 10. Have documentation performed by other than programmers. 11. Keep personnel on project for duration of project. Do not remove them even to put out brush fires. 12. Improve communication between lower level management and team member level. 13. Require everyone to comply with project controls. 14. Complete test plan. 15. Have better control of project resources.

1. Requirement maturity less than originally stated. 2. Development tool (including facility) inadequately specified. 3. Computer memory insufficient to satisfy the computation load. 4. Staffing plan not consistent with development activities.

1. Highly motivated inexperienced staff can consistently out perform less motivated senior staff. 2. Never believe anything a computer vendor says.

1. Keep software test in the software project team. 2. Use rate charting to monitor, include status - on manual basis. 3. Have good standards and conventions. 4. Develop support software early. 5. Have software project control facility and facility scheduling. 6. Keep close coordination between test and programming groups.

Use standard vendor supply operating system. Use of high level language, more walk-throughs, more formal specifications.

Be sure the system design is feasible and practical before beginning software design.

1. Independent test team essential. 2. Develop sizing/timing budget for modules and monitor and maintain.

Need aids and support librarians.

Proximity of laboratory, computer facility, test bed and people to each other is the key.

A detailed computer program development plan (CPDP) must be completed early (within 30 days after contract award).

Documentation must be developed during the computer program development. This takes manpower and time which was not planned and allocated.

Require that software is tested by a <u>separate</u> group.

Peer reviews should be used.

1. Politics plays a more significant role than pure technical consideration. 2. Even the presence of a few super stars on the team does not guarantee success.

Pick team carefully, insist on full range of documentation, employ configuration control, use walk-throughs, estimate high - expect the worst, develop accurate/reliable reporting techniques. Control the project.

Need to spell out specifications system, requirements with CM procedures, change control, baselines; more user involvement, product test plan by user.

Detail requirements definition; code walk-throughs; early test planning; extensive engineering documentation: very, very important.

Do not let customer dictate schedule, design and configuration without contractor concurrence and agreement.

Need to spell out specification requirements with configuration management procedures, change control, baseline, more user involvement, product test plan by user. Scheduling around holiday causes delay. "Programmer is a programmer is a programmer" isn't true. Extensive time away from home costly and hard on personnel with compensatory time higher than needed.

QUESTION 164 (Formerly Question 25 of PART THREE of original survey form) Please furnish any additional comments or statements concerning this survey or the science of software engineering project management.

ANSWERS

Hope you get many completions, hope you can digest this, good list of though items. Suggest followup interviews with selected submitters to get "personality" of company/project.

There appears to be an over emphasis upon quantifications of subjective functions. It is more important to define visibility methods and automated procedures to keep programmer ingenuity out of straightforward program design.

Software engineering management differs very little from the R&D or prototype development of hardware. Unfortunately there is a tendency to compare software development, which has no real production (repetitive) phase with the production phase of hardware development. Software development is a design and test effort.

Many of the questions asked, especially in Part 3, are philosophic in nature. Software engineering is still at issue as a discipline. I believe that many approaches to managing software are valid, and that many problems result from [failures in]: 1) the application of uniform standards, and, more important, 2) the commitment to enforcing such standards. If this results in additional initial costs during the development of projects the savings will off-set that cost, many fold over the life of the system.

Software development is a very tough management problem. It isn't clear whether formal techniques are a significant aid, and, if so, whether they justify their overhead. Honest, published case studies addressing those questions are needed. Time and effort estimates, especially, are a problem. Software projects are chronically subject to cost overruns and schedule overruns, or alternatively, failure to fully meet objectives. How can this situation be overcome? I found it difficult to relate much of the survey to the particular project I was addressing. Primarily, this was because the survey presupposed orderly progress from a clear starting point to delivery. The project didn't (and probably couldn't have) gone that way.

Seems to be a universal difference between the way things are and the way they ought to be. Primary case in point is the extensive modifications necessary in most specifications subsequent to their initial development. This has a ripple effect on software development down stream. Until such time as the perfect specifications writer is born, some small part of the "science of software engineering" will remain an art, and hence, undefined and unmeasureable. We should probably accept that, and realize that all decisions cannot be made on the basis of 100 percent accurate information. The survey itself was exhaustive and exhausting. It will be interesting to see if general conclusions can be drawn from these questions, particularly from projects which do not necessarily "fit the mold". Good luck.

This data should be collected by interview instead of a standard form due to the varying organizations and projects.

The answers to this questionnaire are based on a by-gone project, and do not necessarily represent the way [we are] now managing and developing software.

I wonder how many souls had the patience to go through this questionnaire. Good luck!

The following are extracts from correspondence received by the authors from the Surveyees.

Correspondence Extract 1

We had a bit of a problem in trying to construct answers which would be meaningful and reflect the true state of affairs at our Division.

We are a Division of a Parent Company. Consequently, we can be viewed as a corporate entity, as a division, or as part of the total corporate entity. I chose to regard ourselves as the total entity for purposes of answering this questionnaire. The only exception to this is the answer to one question in which we have a corporate systems group which are used in evaluating any purchased software. This is a response to Question 32, Part I.

Another difficulty which I encountered was interpretation of whether the questions should be addressed only to what we call our data processing group who are responsible for the general divisional computer use. It is this group which generally writes the business programs, e.g., payroll, inventory, bill of materials. In addition our product involves the computer in essentially every case. Consequently, we have a large body of people who program computers for the product which we sell. In order to accommodate these two diverse activities I have had one questionnaire filled out by data processing to reflect activities for which they are responsible and the other filled out by different people dealing with the actual product. Typically we may refer to what they are doing as applications programming.

A further complication arises in that we have a group of software specialists who write special software in support of the applications programmers. These people write edits, debug routines, maintenance and test routines, library routines and the like. Their work gets very similar to the kinds of programs that we would generally be buying for the data processing group from outside sources.

As you can see we are somewhat complex and interpreting our data may be difficult for that reason.

Correspondence Extract 2

Just a note - thank you for the opportunity to respond. Some comments follow:

The questionnaire was very difficult to answer in some areas - interpreting/applying the question to our project was often frustrating.

The emphasis was on ADP - but I believe, for real-time systems - that the true significance has been missed. The thought is this: the engineering has now moved into the computer, rather than being realized as discrete logic, etc. Your "analysts" may be skilled, but it can't be done without the software-knowledgeable, system-knowledgeable engineer.

My encouragement to you on this survey and the consolidation of responses.

Correspondence Extract 3

As I told you in my phone call I am seriously concerned that the answers to this questionnaire may be misleading. The questionnaire seems to me to embody a number of assumptions about organization, personnel, staffing, work flow, responsibility, which are applicable to a traditional data processing center, but which are less appropriate - or even wrong - in the effective engineering uses of embedded computers. At least we do not do things these ways [. . . .]. I am concerned because the thrust of new DoD directives and policies is in the direction of concepts that frankly I consider obsolescent and inappropriate.

Correspondence Extract 4

Enclosed please find the completed survey forms. We apologize for our delay in responding, but the forms arrived while the primary respondents were on vacation.

. . . two programs [were] reported on.

[The first] project was characterized by the judicious introduction of advanced software techniques and very strong project management and reviewing practices. (As an example of the latter, the software was treated as hardware under the same configuration control system.)

In summary, the computer systems were delivered on schedule and slightly under budget. After two years of continuous use very few software errors have been detected.

The [second] project was one where almost no advanced software or management techniques were used, and yet the program culminated with a successful . . . test . . . within budget and on schedule.

In conclusion, we hope these responses reach you in time to be of use and we look forward to meeting with you and seeing the results of the overall survey at the AIAA Conference.

Correspondence Extract 5

In response to the referenced letter, we have enclosed three different completed copies of your software development questionnaire marked (A), (B) and (C). Each of the questionnaires was completed by different group supervisors in our Programming Development Section.

. . . Their responses are candid, their own and no higher level organizational image polishing has been applied.

Your questionnaire aroused much interest . . . and numerous copies of the questionnaire were distributed for evaluation, comment and discussion. Needless to say this Section has an excellent record, but they are continually seeking improved techniques for increasing the overall productivity of their software development teams. The persons completing the questionnaire believed that the exercise was fairly time-consuming, sort of soul-searching, but very worthwhile.

Correspondence Extract 6

I greatly regret the delay in providing the enclosed data which was promised to you for a much earlier date. In part, interestingly enough, this delay relates to the subject of the survey in that we have been examining our organization's approach to software development and are in the process of revamping both the organizational structure and the methods and procedures used in connection with the development of embedded software. We expect by this means to improve both the quality of our product and our efficiency in producing the high quality software our customer's require. Again, please accept my sincere apology for the extended delay. Thank you.

Correspondence Extract 7

I have struggled through the questionnaire and filled it out as best as possible. It seems to be aimed at the big project with lots of people, lots of management, documentation, configuration control, etc. These are all things which, in my judgement, guarantee failure and overruns (usually both). I have become convinced that the only way to manage complex software projects is with a small group (not more than ten) of competent people. If the project is large, it must be developed incrementally.

Telephone Call Extract 8

Mr. "Smith" called concerning the survey. He thought that the survey was super, well-liked by all of them at his organization, and he asked permission to use it as internal survey to determine how their developments were going. Apparently Mr. "Smith" and his Corporation need some means of keeping software project history. They view our survey as a means of doing this.

Correspondence Extract 9

Here it is at long last - warts and all. Good luck.

DATE
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